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[OFFICIAL NOTICE.]

Change of Meeting Place, Western Gas Association.

OFFICE OF THE SECRETARY,
WESTERN GAS ASSOCIATION,
NEW ALBANY, IND., Feb. 7, 1898.

To the Members of the Western Gas Association: The Board of Directors of the Western Gas Association, acting in accordance with Section I., Article VI., of the by-laws, have voted to change the place of our next annual meeting (May, 18-20) from Mount Clemens, Mich., to Detroit, Mich.

They did so upon the recommendation of the Executive Committee, who last month visited Mount Clemens. They found the hotel arrangements inadequate to accommodate the numbers of members likely to be present, unless they were divided amongst three separate hotels. No definite assurance that a suitable room could be obtained to hold our meetings, together with the fact that the means of transportation to Mount Clemens from Detroit—at which latter place the majority of the delegates to the meeting would first arrive—might occasion vexatious delays, caused the Executive Committee to unanimously submit to the Board of Directors the proposition to change the place of meeting to Detroit, with the above stated result.

JAS. W. DUNBAR,
Secretary.

Death of Mr. J. D. Thompson.

We regret to report the death of Mr. J. D. Thompson, so well and favorably known to the gas industry through his long and honorable connection with the Laclede Gas Company, of St. Louis, Mo. His death, which occurred on the morning of the 15th inst., was the sequel to a long and painful illness. Next week we will publish some history of his useful career.

[Special Editorial Correspondence.]

TWENTY-EIGHTH ANNUAL MEETING OF THE NEW ENGLAND ASSOCIATION OF GAS ENGINEERS.

YOUNG'S HOTEL, BOSTON, MASS., Feb. 17, 1898.

Dear JOURNAL: The New Englanders could not complain that their meeting time this year was not marked by odd weather conditions, for within the past 48 hours we all have had the experience that goes with rain, shine, snow, frost, thunder and high winds. It is true the thunder storm was of brief duration, and it is also true that snow and frost have been most in evidence; but not all the warring of the elements could stay the interest manifested in the Association's 28th annual meeting. There was a good attendance, the papers were interesting, and the members paid due heed to business, ably directed as the latter was by clever executive guidance. Between members and guests the proceedings were shared in by perhaps 125, and at the end it was agreed that the oldest Association of them all was quite as live as any. Prior to the business proper of the convention, casual chat with many made sure the fact that the gas trade of New England was more than holding its own, for reports of gains in sendout were unvaried, save in the varying percentages. The routine of the proceedings was about as follows:

President Fowler having called the meeting to order, Secretary Prichard read the Report of the Board of Directors, which had to do mainly with additions to and changes in the membership. Twelve new names were added to the active rolls, and one transfer from associate to active membership was made, which is pretty good evidence that the Association offers inducements for the new men that are appearing in the development of New England's gas industry. The Directors, too, proposed a very graceful act in naming to honorary membership Col. W. A. Stedman, who in the earlier days had served the Association manfully and well as President. Even though the exigencies of business had placed Col. Stedman in other than a New England field (he is now in charge of the plant of the Flatbush Company, of Brooklyn, N. Y.), his allegiance to the Association has never swerved, nor has the Association failed to remember his yeoman's service in its cause. It is needless to add that the proposition went through with hearty acclaim. President Fowler's address[1] was next in order. It was well received, and later on some of its passages will likely come in for comment at the JOURNAL'S hands. Routine business, which included report of Treasurer, the reading of correspondence, roll call and appointment of committees, having been disposed of, the Association settled itself to hear the paper on "Gasholder Construction," by Mr. H. A. Allyn, of Cambridge, Mass. The paper was cleverly put together and it led to a spirited debate that virtually brought the meeting to the hour for the noon adjournment. In fact, adjournment was ordered right after a telegram of good wishes and congratulation from the Michigan Association, in annual session at Port Huron, Mich., had been read. The response to that message by the New England Association was in the following words: "Telegram received. We congratulate you on your success, and assure you we feel a mother's delight in her vigorous offspring." The sessions were re-commenced at 3 P.M., the first number on the programme being the paper by Mr. W. S. Allen, of Boston, Mass., who presented a series of interesting "Desultory European Notes," as the programme had it, although the heading to the printed paper read, "Some Notes on European Gas Works." As said before, the "Notes" were brimful of interest, as might be expected from such a close observer as Mr. Allen. The election of officers was then held, with the following result:

President—S. J. Fowler, Springfield, Mass.
First Vice-President—W. R. Addicks, Boston, Mass.
Second Vice-President—W. A. Learned, Newton, Mass.
Secretary and Treasurer—Chas. F. Prichard, Lynn, Mass.
Directors—N. W. Gifford, F. S. Richardson, A. J. Purinton, J. A. Coffin and W. E. McKay.

The third paper considered was that by Mr. N. W. Gifford, of New Bedford. As was intimated in the JOURNAL for last week, the accident that unfortunately prostrated Mr. Gifford early in the month was of severity sufficient to keep him from the meeting, so the paper was read by Secretary Prichard. Mr. Gifford's presentation of his experiences with "Some Incandescent Burners" is a valuable contribution to the literature of the subject. Indeed, it is certain that his tables thereon will often be consulted. The first day's sessions were then adjourned. At 7 o'clock the Association and its guests, to the number of 90, shared the good things provided by the masters of Young's Hotel, and it is saying enough, and all that need be said, when it is said that the dinner was right along the lines of the enjoyable standard set by the New England Association. Mr. McKay acted as toastmaster, and he did his work well.

To-day (Thursday) opened clear and cold, and the attendance and interest are surprisingly well maintained. The proceedings were commenced at 10:30 by a dip in the Question Box, after which came the mournful reminder, in the shape of a report from the Committee on Obituaries, that death had called from the Association no less than five members during the year. The report of Committee on President's Address was considered, and then the paper by Mr. William McGregor, of Pawtucket, R. I., was read. His theme was "The Winning Ways of Gas," and he treated it so efficiently and well that the discussion it evoked was brisk, pointed and profitable. Indeed, the man from Pawtucket has likely put himself in danger of being called on soon for another contribution. The usual hearty votes of thanks to the officers were extended, and the meeting was declared adjourned. No other verdict than that it was a complete success may be rendered. I might say here that the Association came very near having to choose a successor to Secretary and Treasurer Prichard, but he was induced finally to retain the reins. To make it easier for him the Association voted a sum of money to pay for the services of someone to assist him with the routine work, which keeps piling up.—S.

1. See page 201.

[Special Editorial Correspondence.]

THE PORT HURON MEETING OF THE MICHIGAN GAS ASSOCIATION.

PORT HURON, MICH., February 17, 1898.

Dear JOURNAL: The Hotel Harrington has been quite a lively hostelry for the last two days, and it stood the test right well. So did the Michigan Gas Association, too; for its fifth meeting, just closed, was in every respect successful. The weather was decidedly cold, and snow abounds, but the atmosphere was of the sort that sends the blood tingling merrily through one's circulatory system. The attendance was excellent, about 50 members and visitors having responded to the Association's summons. The first session was called at 10:40 A.M. of yesterday, President H. W. Douglas, of Ann Arbor, occupying the chair, the Secretary's desk of course being in charge of Mr. H. H. Hyde, of Saginaw. The report of the Executive Committee recommended the election of 5 new members in the Active class, and of 9 to the Associate class. The Committe also recommended that the constitution be changed in respect of the time for holding the meeting to other dates in February,[1] also that the initiation fees and dues be increased. These propositions were subsequently adopted. The President's address, which dealt largely with local gas statistics, held the close attention of the Association. It was a strong, commonsense and valuable document. The paper (and an excellent one it was) by Mr. Frank H. Hess, of Ann Arbor, on "Experiments with the Welsbach Lamp," led to a lengthy and animated discussion. On the termination of the discussion an adjournment was ordered. The proceedings were renewed at 2:30 P.M., and after some routine business had been disposed of the Association listened to the paper by Mr. Edward J. Ellis, of Detroit, whose theme was "The Utilization of Coal Tar by Distillation." It was in the main descriptive of the good results obtained in the tar distilling plant of the Detroit Gas Company. On the close of the discussion it was decided to name a Committee on Coal Tar, with instructions to study the matter in its various phases and report back to the Association. Mr. S. Milo Dole, of Adrian, then read his paper on "Our Patrons: How to Treat Them." He told his story in practical fashion, and put out some well-pointed truths in the presentation. A general discussion then ensued on prepayment meters, in which the advantages and otherwise of these useful measurers were thoroughly threshed. An adjournment to to-day was then voted. The Association reassembled at 10 A.M. for the second day's sessions. The paper on "An Automatic Closed Purifier," by Mr. H. G. Beatley, of Marquette, was read by the Secretary. In the discussion that ensued many voiced objections to the vessel proposed by Mr. Beatley. The Secretary read letters from Secretary Holmes, of the Texas Gas and Electric Light Association, and from Secretary A. P. Lathrop, of the Ohio Gas Light Association, inviting the Association to take part in the next meetings of the named bodies. A telegram of congratulation was received from the New England Association of Gas Engineers (then in session in Boston), in reply to one that had been sent by the Michigan Association. Lansing, Michigan, was then named as the next place for meeting, after which the following officers were chosen for the ensuing year:

President—C. H. Raynor, of Adrian.
Vice-President—L. E. Walker, of Lansing.
Secretary and Treasurer—H. H. Hyde, of Saginaw.

The report of the Committee on President's Address recommended among other things that hereafter the address and other set papers for the meetings be printed in advance of the meeting for distribution amongst the members. The recommendations were adopted. Messrs. T. B. Guitteau, J. J. Knight, J. C. Sterling, E. G. Van Wie, S. E. Wolf, A. L. Zwisler and F. G. Corbus were named to prepare papers for the next annual meeting. At 11:40 the meeting was declared adjourned, although an executive session, to be participated in only by active members, and no report of the proceedings to be taken, was held right after the general adjournment. On the invitation of Mr. Joseph Walker the members and guests visited the Port Huron Club, and Secretary Hyde photographed the delegates, "just after dinner."

The paper, by Mr. Robert Calhoun, on "Reminiscences," which was read just after the receipt of the telegram from the New England Association, was decidedly humorous in its treatment of certain matters. Although there was no really formal entertainment, the members all enjoyed themselves thoroughly; perhaps not the least of the fun having been had by those who "assisted" in the performance of "Coon Hollow," at the Opera House last night. You may safely say that the Michigan's fifth meeting was all right.—C.

1. It was eventually determined to hold the meetings on the third Wednesday and Thursday after the first Monday of February.

[Prepared for the JOURNAL.]

The Progress of Purifier Construction and Operation, with an Instance.

By MR. H. A. MATHER.

For many years but one form of purifier design has obtained, except in isolated cases, until now, so familiar has the accepted plan and method of working become, that recent technical and chemical writers on gas construction and chemistry confine their descriptions of purifiers and their operation within the briefest possible space. After over 20 years of use of the water lute purifier and dry center seal (that usually turns but one way, and permits continuous working only), the majority of gas works are still following the same practice, and are, in most cases, dissatisfied with their results. During this period of time the remainder of the plant has been entirely remodeled and altered; and in some cases the entire method of manufacture has been changed to water gas, it may be, or it has reverted to coal gas. If the superintendent who died 20 years ago could revisit his former plant to-day, but one familiar construction would greet him. The purifying boxes might indeed be the same; if not they would certainly be grown-up brothers of his former acquaintance, and sight of them would certainly recall to his mind his anxiety and annoyance of former days, during holiday season working.

Some new construction of purifiers[1] was explained at length, at the October, 1897, meeting of the American Gas Light Association, through the medium of papers read respectively by Mr. F. H. Shelton and Mr. W. R. Beal. One proposed a condensed form of purifier, making the same area or less of exposure of oxide, but increasing the depth or height of the purifier, doing away with the water lute, and making quick dumping and discharge practicable. Mr. Beal proposed a modification of the water seal purifier that would entail a substantial alteration of the box, but his method of operation is unfortunately nothing more than an experiment as yet, though grounded on common sense and careful workmanship.

The two-box system of purification is an old proposition, according to "King's Treatise;" later some one reasoned that if two boxes in series were good, three would be better, and the fourth box in series was a natural sequence of events and ideas. Occasionally in the former days some original genius revolted from precedent, and constructed boxes on the parallel plan, but either he died early or his methods were faulty, for gradually but surely the present system came into general use to be accepted and execrated by everyone.

The rigid laws relating to impure gas have compelled more careful attention to purification and purifiers, on the part of the English and Continental gas engineers, than is given the subject in this country. "On the other side" a change of purifiers is a *ceremony*, here it is an *incident*. Because of their compulsory attention to purification the foreign purifiers are almost invariably of ample size for some time to come, while ours are usually too small for efficient working *under the present series system*. But even with their larger purifiers, presently the English engineers must face a serious constructional problem, viz., how to construct a wrought iron cover large and strong enough to close enormous water lute purifiers, and still make provision for speedy raising and lowering of these covers. Eventually some modification of the present system will be generally accepted and used. Some few men have successfully surmounted this obstacle of large construction by abandoning the familiar water lute purifier and substituting therefor the dry seal. None of these constructions has met with greater meed of success than that designed and erected by my friend, Mr. Henry M. Greene, of the Preston (England) gas works, to whose kindness I am indebted for much of the description following.[2] Mr. Greene does not claim originality in the adoption of rubber sealed purifiers, in fact he does not claim his dues in this matter of originality; but if ever engineer left his hall mark on a works in his charge, Mr. Greene has indelibly impressed his individuality on the Preston gas works. The purifiers are but one of his successful departures from custom, and a visit to the Preston works would well repay anyone making a journey abroad. These purifiers have successfully withstood the test of time and usage, and as their cost of construction is *less than one-half* the cost of the usual design of purifiers of the same size, they may commend themselves to the further attention of those who do not desire to experiment, but who have found present construction and practice costly and inefficient.

1. See JOURNAL, Nov. 8, 1897, p. 727; also JOURNAL, Nov. 15, 1897, p. 765.

2. A brief description of these purifying boxes appeared in the *Journal of Gas Lighting*, Nov. 5, 1895.

There are six purifying boxes in this house, their tops making a continuously flat floor, so that to a casual inspection of the inclosure an impression of an empty coal storage shed is given. There are three boxes on each side of this shed, which is approximately 200 feet by 90 feet. The linear sides of the boxes set into and form part of the wall on either side of the house, and the series of boxes are divided by a gangway about 20 feet wide, running the entire length of the house, thus forming a convenient space for the connecting pipes and hydraulic center valves. Two of these purifying boxes are 90 feet × 35 feet × 4 feet, and four are 35 feet × 30 feet × 4 feet. The ends of the two larger boxes on either side form the end wall of the smaller box joined to it; this box performs like service for its neighbor. Thus the two series of boxes are huge receptacles, inclosed on all sides, but divided internally into three sections each.

The two larger boxes are oxide purifiers, and their center seal is arranged so that they may be used either singly or together in series; three of the smaller boxes are lime boxes, arranged with center seal to work two in series, with one "off" box; and the fourth box is a "catch" oxide box, through which all of the gas must pass before reaching the meter, except in the rare case where it "fouls." Then its center seal bye-passes direct to the meter. Foul gas almost never reaches this box, and it has seldom been changed.

These boxes are supported longitudinally and across section on heavy iron beams, and internally they are braced and tied together as follows: Every 7 feet 6 inches a heavy iron plate is bolted between the flanges of the top, bottom and side plates and projecting 2 feet into the box. This serves to keep the sides and ends of the box absolutely rigid, and also supports the permanent section immediately above it. The permanent cross and longitudinal gangways are supported and tied to the bottom plates by posts, which project between and are bolted to the plates top and bottom. Beside these posts, which are 7 feet 6 inches apart longitudinally, and 3 feet 9 inches apart under the cross section gangways, other posts are bolted to the bottom plates and project nearly to the level of the openings. All of these posts serve as supports for the tray bearers, and contain sockets shaped with that end in view. The covers of these boxes are all of the same size, viz., 13 feet 9 inches by 11 feet, and the small boxes have four each—the large ones twelve each. Every one of the openings is edged on every side by a planed rim upon which impinges the gasket which is attached to the covers. The latter are composed of several layers of iron plate bolted together and framed with angle iron on the under side. Into the edge of the covers **U**-slots are cut so that the bolts may conveniently enter without taking the nut off each time. The bolts are attached to the gangways back of the planed rim with slots immediately behind them, so that they may be turned down below the top level immediately the cover is removed and thus be out of danger of breakage.

Mr. Greene has used the same rubber gaskets for over six years without any appreciable erosion from gas action, and he makes from 30 to 40 per cent. of water gas; he has also used hemp rope, soaked in boiled oil previously, and attached to the cover by white lead, with equally as good results as with rubber. The rubber gasket is attached to the cover by waterproofer's solution. The secret of the non-leakage of these covers is that the smooth surface of the planed rim edge is luted with graphite, after it has been carefully swept, before the cover is bolted down, each time the box is closed. This system undoubtedly requires more attention than the water lute, but the results are not comparable, either in cost or efficiency.

The larger boxes carry two 15-inch to 18-inch layers of oxide, and the lime boxes four 3-inch layers of lime.

The oxide boxes have six inlets and six outlets each, but Mr. Greene is candid enough to state that this provision for circulation is in excess of the requirements.

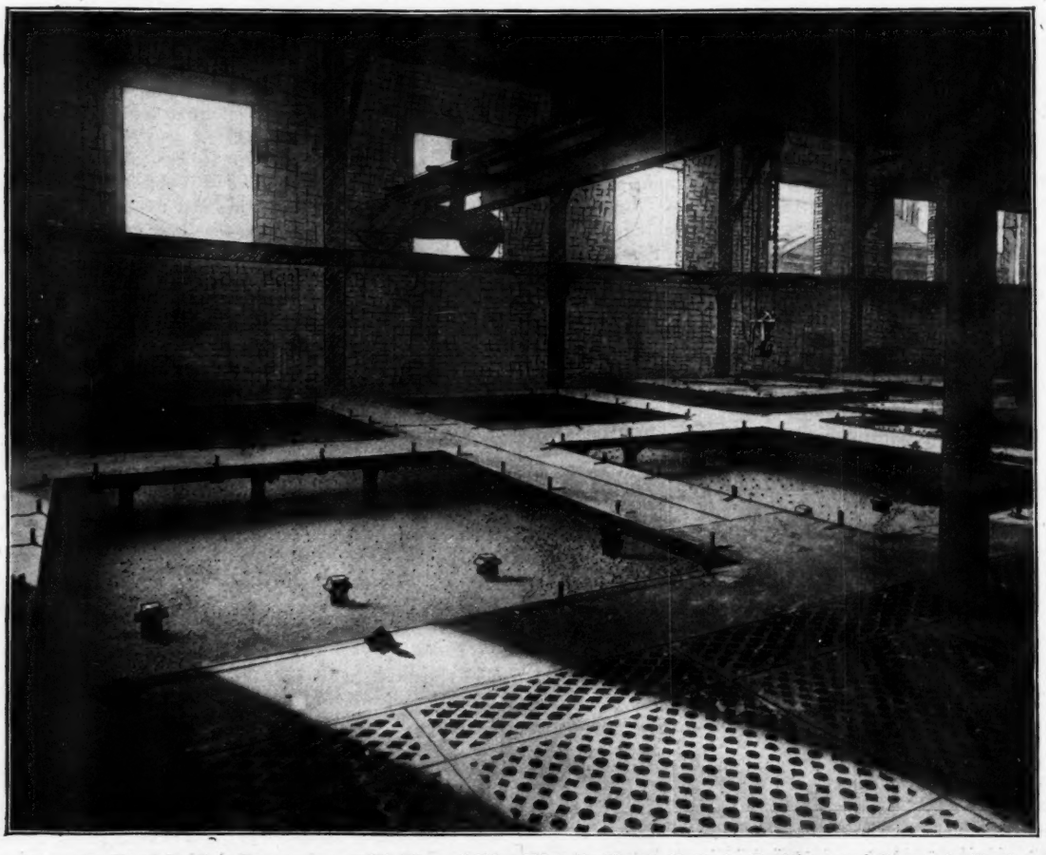
In the center of each open space a plug is let down into the opening in the bottom of the box which connects with the dump chute pipe. This plug is luted with graphite on each placement, and, together with the retort lid cap on the lower end of the chute pipe, makes a double seal to the dump chute, so that if a careless cartman should strike against and open the cap to the chute, the heavy plug above would be ample safeguard against leakage from that quarter.

The cellar below is about 14 feet high, and is used for spreading and revivifying the oxide.

As the oxide boxes are changed but once a month, Mr. Greene considers it more economical to cart to the box from below each time rather than put in permanent and costly lifting apparatus, such as is customary with the newer English gas works.

The operation of these oxide boxes is as follows: The boxes are run in "series" until both layers of the first box are charged and the bottom

Lime Box Open in Foreground, Showing Internal Bracing of Gangways and Closed Oxide Purifiers in Distance.



Cross and Longitudinal Section Gangways, with Planed Rim Edge Outlined, Bolts in Position and Covers in Background.

Dumping the Oxide Purifiers, Showing Manner of Raising the Plug Covers of Dump Chutes.

layer of the second box shows a slight stain. Then the first box is shut off and refilled while the top layer of No. 2 box is bearing the entire burden of sulphur purification. While this is apparently dangerous, it is really safer than if the cubical contents of the top layer should be divided into two layers in a box one-half the size; for it should be appreciated that the gas is passing through the layer of larger area at but half the speed of the latter instance. In addition, Mr. Greene has his small "catch" oxide box, if aught should go wrong with his large one.

This system of Mr. Greene's is a unique adaptation of the 2-box system of purification advocated by a prominent gas engineer of this country at the last meeting of the American Gas Light Association. Before these purifying boxes were constructed by Mr. Greene (they have been in use for some years), his back pressure, incident to his increased make of gas and the very small main pipes in use, compelled him to devise some system of relief with his old purifier construction, and in speaking of the necessity that brought about his change from the three boxes in series method, and eventually led to the abandonment of water sealed boxes, Mr. Greene describes a method of temporary adjustment of trying conditions that may not have occurred to some engineers here in this country who are in like difficulty. He says: "I should never think of going back to the old plan of working with four purifiers (three at work and one idle). When I first adopted this plan it was in consequence of heavy back pressure. I then had eight purifiers, two sets of four each. I made the change by coupling the four inlet pipes and the four outlet pipes together, thus converting four purifiers into one, and by the change I had a reduced back pressure of 7 inches; of course, this would vary, according to the saturated state of the oxide—less when the oxide is new and more when it contains 40 to 50 per cent. of sulphur."

There are many gas works in this country—in fact the majority—with similar circumstances, *three purifiers inefficient and one idle;* and it might be well worth the while of the engineer so situated to couple his inlets and outlets together, thus converting his four boxes into two boxes, even if he did not so change his plan of operation as to introduce the same system that is used so successfully in the Universal Gas Company's works in Chicago. That is, dividing the 4-box system into two series of two boxes each. The change is made on stain of first box in each series, and while these two first foul boxes are being changed the gas is passing through No. 2 box alone in each set. Thus the same principle of area exposure is preserved even during a change, and the area of exposure of purifying material is double that of the 4-box system.

The gain to the oxide, considered by itself, would be considerable; for the oxide would have, first, greater time of contact, thus assuring a more complete reduction of hydrogen sulphide per inch of material penetrated; second, the changes of box would be less frequent—a net saving of about $15 for each change of 1,000 bushels; third, the life of the oxide would be proportionately longer, owing to better working conditions and longer time for regeneration allowed; and, fourth, fixed, insoluble sulphides would be less liable to form under these favorable conditions, thus insuring more rapid and complete reviving, proportionate to the work accomplished.

A careful review of the comparative advantages presented by the 2 box versus the 4-box system will undoubtedly convince many who are contemplating a larger set of 4-box purifiers, that *the real necessity is not new purifying boxes, but a new system with the old apparatus.*

It should be noted that the gain in number of changes of box due to this alteration of system does not represent a saving of 50 per cent. in the number of changes as would at casual glance appear, for the cubical contents of material exposed is neither more nor less than that exposed now by the 4-box system; in fact, the gain is one of proportionately better working only. The advantages of the 2-box system might better be defined by a problem, namely: If the square area of the first box in the 4-box system purifies the given quantity of gas imperfectly at the given rate of speed, how much purification would double the original square area give, or the same area at one-half the given rate of passage of gas? So, considering the capacity of the present boxes unaltered, the total gain in service by alteration to the 2-box parallel system will not duplicate one's present service; but it would probably prolong the usefulness of one's present boxes from five to seven years. By the time that new purifiers become to the majority the necessity that they appear to be now, the 4-box system will have vanished with the ghost of the old gas engineer, or will be consigned to the keeping and practice of those engineers who, when a change of any kind appears imminent, bow their heads and cry out, like the present French Royalists to continually inattentive Republican ears: *Le Roi est mort; vive le Roi.*

Some Remarks on Standards of Light.

[By "VERITAS," in *Journal of Gas Lighting.*]

There are some people existing in this mundane sphere who regard photometry as an exact science. Writing as one who has had considerable experience, to use a colloquial phrase, I beg to differ. A definite issue may be raised as to some new standard of light; and two or three experts acting independently arrive at quite different conclusions. As a desperate resource, a committee of experts may be appointed; and though a report may be eventually issued after long delay, occasioned by strong differences of opinion, the published document is found to be simply a compromise.

The difficulties in practical photometry are very great. There is not only the matter of a reliable standard of light, but there is also the question (too frequently omitted) of the conditions under which the gas should be tested in order to afford the truest and the most just results. For official purposes, in connection with public gas supply, it is undoubtedly absolutely necessary to have a fixed standard of light and a definite prescription as to burner, consumption, etc. Under the present *régime*, we have (so-called) standard candles on the one side and a Sugg "London" Argand, with a 2-inch by 6-inch chimney, and a fixed consumption of 5 cubic feet of gas per hour on the other. Modern developments present us with two factors acting on both sides. In the first place, candles as a standard of light are unsatisfactory, and might be replaced by something much more reliable. In the second place, the rigid adherence to the rule of an absolute 5-foot consumption in a Sugg "London" Argand is grossly unfair, as the prescription does grave in justice to the gas when it drops below the nominal 16-candle value. With regard to the latter consideration, we have also to remember the vast improvements which have taken place in the development of light within a comparatively few years. The gas supplied to the public is still tested by a burner which, in its time, was considered to develop more light from the gas than the ordinary burners then available; but we have now in the regenerative burners, and more especially in the various forms of incandescent burners, a development of light in proportion to gas consumed far in excess of what was dreamed of in past years.

These remarks are simply preliminary to the main question—viz., that we require a more reliable standard by which to have the public gas supply valued, and that it would also be desirable by some alteration of burner or conditions of testing, to modify the existing official prescriptions. It is no doubt hopeless at the present time to expect any change on the latter question; but in regard to some substitute for sperm candles, it may be more in the immediate future to hope for an alteration which will afford a more reliable standard. The Dibdin 10-candle standard seems at the present time to afford the nearest approach to a solution of the question, though for ordinary technical work there is no doubt that the Methven screen is the most convenient. The only objection to the Methven screen as applied to testing gas, is that its value is vitiated, and its results become untrustworthy, in the case of carbureted water gas, which is now so rapidly coming into favor. The question of the adoption of a new standard must necessarily have reference to its equivalence to the older ones in existence. This must be compulsorily under all conditions, whether for abstract scientific purposes, or for the valuation of the public gas supply. For the latter purpose, all the precautions necessary for the maintenance of scientific accuracy are emphasized by the fact of the large issues concerned between the gas companies and the public with regard to the due and proper fulfilment of parliamentary requirements. With gas companies working under the sliding scale, any increased exigency as to maintaining a higher illuminating value must mean greater cost of production, and a less possibility of reducing the price of gas to the consumer; and it is a very doubtful question whether, considering the cost of enhancing the lighting value of gas above a certain limit, and the corresponding necessity of an advance in price, the consumer would, as a balance, derive any benefit.

This is the exact condition in which the suggested substitution of the 10-candle Dibdin standard for sperm candles has placed both parties—viz., consumer and producer The original Dibdin standard (so-called 10 candles) was found to be equivalent to about 10.8 Miller candles in use at the time of the investigations of the Standards of Light Commission. A compromise was eventually effected, in which the height of the screen attached to the Dibdin standard was lowered so as to decrease the proportion of light emitted by the burner for testing purposes. Trusting to memory, and without reference to official documents, the Dibdin standard was eventually set at equal to between 10.3 and 10.4 Miller candles. This arrangement, although accepted as a compromise between opposing parties, was distinctly unsatisfactory to gas companies in general, as, if adopted, it would give a pronouncedly deteriorated value to the gas which they supplied in comparison with that indicated by the ordinary sperm candles in general use. The compromise was mainly effected on the grounds of an allegation that the standard candles at present in use did not afford as much light as those employed when the original Gas Acts were passed, and the respective companies accepted their obligations to supply 14 or 16-candle gas. It is to my mind very doubtful that this gross charge against the apparently innocent candle has been duly substantiated. This, at least, was admitted—that the valuation of the average light of a candle was in the old days mainly taken on the 1-candle pentane unit; and it was subsequently allowed that the aforesaid 1-candle pentane unit could give different results according to the conditions of the particular experimenter. The unsatisfactory compromise between the local authorities and the gas companies has never proceeded further; and, to the best of my knowledge, no steps have been taken to procure any alteration in the existing standard of sperm candles by an application to Parliament, which is necessarily the only course open. Possibly both sides are nervous; the local authorities especially feeling the powerful opposition which would be brought to bear by the whole of the gas industry in a matter so vitally affecting their interests.

Omitting the question of the rating of the Dibdin standard as to its equivalence in ordinary sperm candles, I am strongly in favor of its being a reliable standard of light; and my only regret is that the opposition side to the gas companies could not accept such a modified form as to be equal to 10 average candles at present in use. Had this been done, there would have been perfect accord between the two parties, and the proposed new standard might by this time have become an accepted fact. There is one special point in favor of a constant standard of light of an easily manipulated character, as against candles. Whereas the latter give the most fluctuating results—and it is now a matter of history that (nominal) 16-candle gas may be recorded as 15 or 17 candles—a constant standard will afford a uniform result. The investigations of the Standards of Light Commission at least endorsed the accuracy and the uniformity of results obtainable from the Dibdin 10-candle standard; and it has been left to the special report of the Incorporated Institution of Gas Engineers[1] to discover details which eluded the scientific intelligence of a large body of experts, who devoted a careful and prolonged research to the subject. Without making any allegation as to the efficiency of the gentlemen who have signed this preliminary report, and without entering into any criticism of their figures, but simply confining myself to their summary, I must candidly confess that their conclusions are most extraordinary and most inexplicable; and that they would be received by one who has had as much experience on the subject as I have, with a large amount of skepticism.

That the proposed standard (10 candle Dibdin) is of greater value than ten average standard candles, we all know; and this fresh information is simply superfluous. The question of the selection of a suitable chimney is a frivolous matter. The Dibdin standard only requires the proper size in height and diameter, in exactly the same way as the Sugg "London" Argand, or any other standard of light. A further conclusion is that the standards which may agree with each other on one particular occasion, do not give the same results from day to day. Why not? and who among the mixture of genuine and *quasi* photometrists is responsible for this opinion? Another statement is to the effect that the light values of two standards removed from one end of the photomoter bar to the other give different results. Can our recent experts explain this? and it is also true for the Methven screens? As to the allegation regarding a change in light value by an alteration in the height of flame, it is well known that the flame has to be kept within certain limits; but these are sufficiently liberal for anyone, even with a limited knowledge of photometry, to conform to. I doubt very much whether the temperature of the atmosphere affects the question, though bad ventilation or draught no doubt does.

As to clause 3 in the report, I cannot express any definite opinion, except that I believe Mr. Dibdin has most confidently stated that, whether air or gas is saturated with pentane vapor, the light is the same. Clause 4 is somewhat peculiarly worded. As it stands, it would utterly annihilate any idea of the adoption of the Dibdin 10-candle standard. If the chimney has to be standardized with the burner, what would happen if a gas examiner accidentally broke a standardized chimney, and had to replace it with one conforming to the ordinary accuracy of measurements of height and diameter?

In conclusion, I can only add that it may be seriously a matter of doubt whether this most recent investigation on the subject of a new

1. See JOURNAL, Feb. 7, p. 202.

standard has given us more *light*. I do not wish to be too sarcastic, but it seems a fitting sequel to my previous comments to finish with a well known quotation, substituting the term "committee" for "gentlemen:" "The honorable committee has said much that is true and much that is new; but, unfortunately, that which is true is not new, and that which is new is not true."

(Concluded from page 251.)

Surface Plants of Bituminous Collieries.

[A paper read by MR. W. G. WILKINS, C.E., before the Ohio Institute of Mining Engineers.]

Another device for use at a shaft, which while it does not reduce the number of men required at the top, increases the capacity of the mine by reason of the decreased time required in caging the mine cars, is the "Ramsey Caging Apparatus." This device is the invention of Robert Ramsey, General Manager of the Standard Coke Works, and as with it the coal is only dumped once, the objection on that account to Mr. Bond's hopper cannot be argued against this. The apparatus consists essentially of two steam rams placed back of the shaft, and two transfer tracks running on a track across the tipple in the rear of the head frame, which are operated by a steam cylinder. Its operation is as follows: After a car has been dumped it runs back by gravity past one side of the head frame on to one of the transfer tracks, which is then moved by means of the steam cylinder to the rear of the compartment where the next loaded car is coming up. When the cage with the loaded car is at the landing the empty car is pushed by means of one of the steam rams against the loaded car, which is then taken off the cage and the empty car left on the cage ready to descend, so that the loaded car is shoved from the cage and the empty one pushed on all at one operation, thus saving considerable time in the caging. When one transfer track is back of the head frame with its empty car, the other track is in position to receive the next empty car as it comes from the dump.

As to the capacity of the apparatus, there has been handled at the Standard Works 3,021 tons of coal in 8½ hours, or for 275 days in 1889 an average 2,143 tons. While this apparatus has thus far been used at coke work mines, it would seem that its combination with automatic cross-over dumps, at a tipple with two dumps would form an advisable combination at a mine where the shipments were run from 2,000 to 3,000 tons per day.

At the First Pool Mines, near Pittsburgh, Mr. Selwyn Taylor, M.E., had devised a novel method for taking the empty cars from the dump to the rear of the head frame where they are caged. The operation is accomplished partly by gravity and partly by means of a dummy devising car to which motion is given by means of a wire rope from the shieve shafts. There are switches and "kick backs" at both ends of the tipple, the ones at the front to send the cars to the dummy and the one at the rear to send them down to the back of the head frame preparatory to their being caged. The device accomplishes the purpose for which it was intended in an economical manner, as the power required is furnished by the main hoisting engine instead of by rams as in the Ramsey apparatus.

Another source of saving is in having the boiler house so located that the coal for the boilers may be taken in pit cars and dumped either in the boiler house directly in front of the boilers, or into a bin outside of the house from which the coal can run by gravity to the front of the boilers, thus saving handling of the coal used in making steam. The boiler house should be located if possible on a lower level than the engine house, so that the main steam pipe will drain towards the boilers, which will result in having drier steam with a consequent saving of wear and tear on the engines. The use of a steam separator and feed water heater is also advisable, the first to give dry steam and the latter to save fuel.

Some of the methods recommended above for effecting a saving may seem trifling, but it should be remembered that pennies make dollars, and a saving of here a little and there a little every day, in the course of a year's run, means the transfer of the balance of the profit and loss account from the wrong to the right side of the ledger.

A few words as to the character of the structures composing the surface plant may not be out of place. Most of the mining laws of the various States provide that all structures near the shaft or pit mouth must be covered with fireproof material. The writer believes that at plants which will in the future be very largely built, plants having a capacity of 2,000 tons a day and upwards, it is economy in the end to build the tipple or head frame of steel, and the various buildings of the same materials, or better still, of brick with steel roof trusses. The danger of fire is lessened, thus reducing the cost of the insurance, and it also has a good effect on the employees of the surface plant. The writer believes that the machinery will receive better care and attention if it is placed in a well-built and commodious building, than if it is covered with a building that some farmers would not have a cow in.

The number, kind and arrangement of the screens and chutes in the tipple will vary according to whether run-of-mine coal only or various sizes are shipped, and whether the miner be paid for run-of-mine or lump coal weight. The character and pitch of the screens will depend upon the nature of the coal, whether hard or soft and friable, and whether wet or dry. The arrangement will also vary in accordance with whether the slack can be loaded direct into railroad cars as the coal is screened and shipped immediately, or whether the slack must be stored while waiting shipment or sale. The number and arrangement of screens and chutes will also depend upon the output of the mine, as the amount of coal that can be properly screened over one set of screens will vary with wet and dry coal. The arrangement will also vary when box cars as well as gondolas are to be loaded.

When it is considered that there are flat bar screens, diamond bar screens and perforated plate screens; that some or all may be stationary, that some or all may be shaking screens, that some may be revolving screens, and that the coal as it comes from the mine may contain so much slate that picking tables may be necessary, it will be seen that the design for a tipple equipment to produce the best results with the coal that is to be screened is not a simple proposition. When all the factors as noted above are taken into account the problem becomes more complicated than would at first appear.

At some mines in Pennsylvania the miner is paid for run-of-mine coal, and the coal is not screened at all before shipment. Where these are the conditions the tipple equipment is a comparatively simple matter, as it consists only of the tipple dumps and chutes for discharging the coal into railroad cars. With a plant of this kind 3,000 tons of coal have been loaded in 10 hours over two dumps. Where, however, the coal is screened before shipping, the tipple equipment is more complicated, as shown above.

As the majority of mines are situated at some distance from towns where there are machine shops, and as there are always more or less repairs to machinery and pit cars required, it is almost a necessity to provide not only a blacksmith shop, but also machine and carpenter shops. The size of these shops and their equipment will depend upon the extent of the plant and the capacity of the mine. The carpenter should be so situated that the pit cars can be run on tracks from the pit mouth directly into the shop, and the blacksmith shop should be close to it, so that any smith work connected with the cars can be done quickly and without loss of time going from one shop to the other. The machine shop should also have a track running from the pit mouth into it, and if electric or compressed air locomotives are used there should be a locomotive pit in the machine shop to allow access to the underside of the locomotive without being compelled to jack it up off the tracks. The tools necessary for machine work are about a 24-inch by 10 feet engine lathe, a drill press, grindstone, and one or more work benches.

If compressed air be used in the mine, the blacksmith's forges can be blown with this medium, and the ordinary blacksmith's bellows can be dispensed with. The blacksmith shop should also be furnished with racks for the storage of the various sizes of bars that are to be kept in stock.

About as convenient an arrangement as can be had for the shops is to have them all in one building, which can be divided into three rooms, one for the carpenter, one for the blacksmiths, and the third for the machine shop. By this plan all the operations of repairs requiring the three kinds of work are kept close together, and no time is lost in running from one shop to another.

A source of frequent loss at coal mines, although not a loss by reason of too great operating expenses, is the loss of stock and hay from the burning of the barns and stables. The barns as usually built consist of two stories, the mules and horses being kept on the ground floor, and the hay in the loft above. Owing to the large losses occasioned by the burning of such barns, it is becoming the custom in the Connellsville region, to build two buildings of one story each at some distance apart, in one of which the mules and horses are kept, and the other being for the storage of hay only. The stable having two lines of stalls with a passageway between them, through which runs a track leading from the hay barn, on which is run a truck for taking the hay from the barn to the stable. By this means the danger of loss by fire

is lessened, as, if one building catches fire, the other is safe, as in the region spoken of the two buildings are generally ironclad or brick, with slate roofs. The Hecla Coke Company, and the Southwest Connellsville Coke Company have both adopted this plan.

One important feature of the surface plant is the ventilating fan, where the ventilation is provided by this means. The writer has quite recently been present at some tests, and has the results of other tests that have been made of the "Capell" fan. He has had one installed under his own supervision, and he believes it to be only justice to Mr. Ciifford, the owner of the patents for the United States, to say that he believes it to be the most efficient fan that has yet been invented for ventilating coal mines. The fan last referred to is a single inlet fan, 13½ and 5½ feet wide, and gave over 100,000 feet on a water gauge of 1 inch, and over 200,000 feet on a 4 inch gauge, and fan running 228 revolutions.

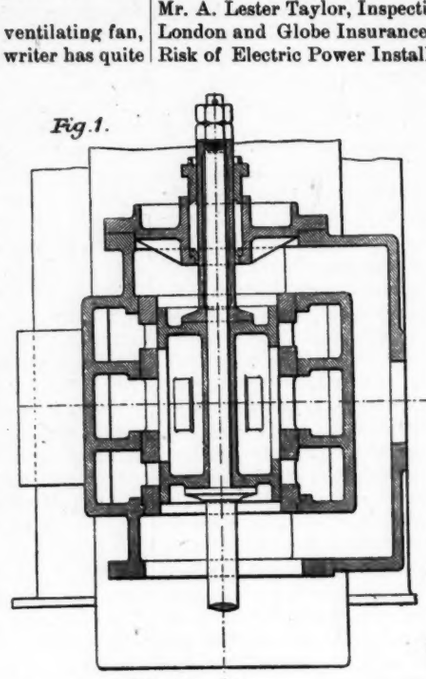
With reference to the type of boilers best adapted to mine work, the author believes there is no better type, and none which will give more satisfactory service, year in and year out, when first cost is taken into account, than the ordinary return tubular boilers having 4-inch tubes. It has the advantage over the plain cylinder or two-flue type in that it requires smaller shells, for the same power, thus reducing the size of the boiler house, and also the boiler settings.

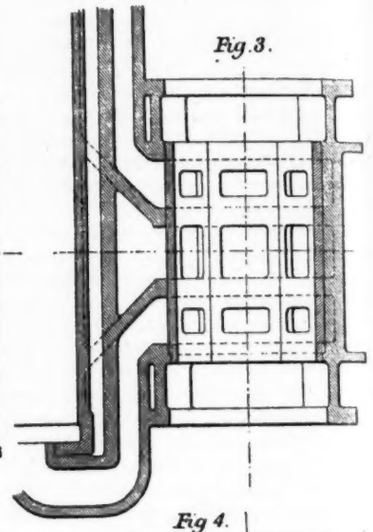
While some of the author's opinions may not be concurred in by others, they are opinions he has formed from the results of his experience as an engineer during the past ten years.

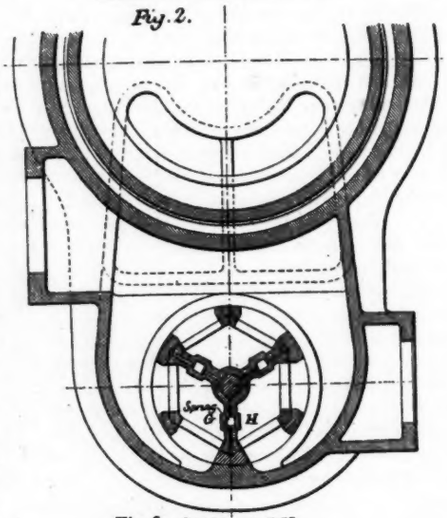
Campbell's Prismatic Piston Valve.

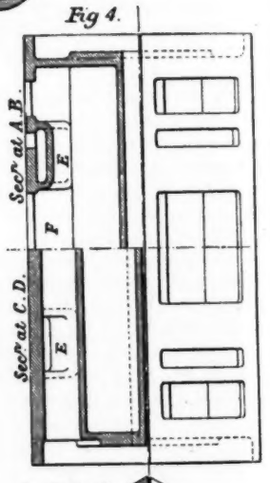
In 1896 Mr. J. Jennings Campbell, of 67 Warwick Road, Earl's Court Road, London, brought out a prismatic piston valve, which has recently been modified and improved in accordance with the construction shown in the accompanying illustrations. From these it will be seen that the valve is a hexagon in cross section, and works in a liner of similar form. The valve is made in three parts (Fig. 2), and between the adjacent surfaces light springs are placed (Fig. 6) to press the sections against the liner. It is, however, only when the valve is being adjusted that these springs come into action. Normally, the three sections of the valve are tightly locked, the whole working as if in one piece. To this end the valve is held between two collars on the valve rod, the lower collar (Fig. 1) is solid with the rod, while the upper is at the end of a sleeve which passes through the stuffing box, and can be tightened down by a nut. The method of adjustment is to slacken the nut and allow the springs to push out the sections against the liner. The nut is then tightened, and the valve again made solid. This adjustment is best done when the steam is at atmospheric pressure and the engine stationary.

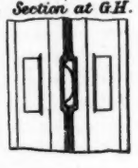
The liner and the three valve sections can be arranged together on the table of a slotting machine in such a way that all the faces can be tooled at one setting. Then the valve sections are wedged into the liner, and the ends of the valve on the outside of the liner turned. The liner is then fitted into a chamber prepared for it in connection with the cylinder, and provided with steam and exhaust passages (Fig. 1). In addition to the usual transverse bars between and outside of the ports, there are in the liner, and also in the valve, longitudinal bars at the angles of the hexagon. Those bars in the liner which are opposite the divisions between the valve sections are indispensable, as they prevent the escape of steam from between the sections. These valves can also be made double ported, as shown in Figs. 4 and 5.

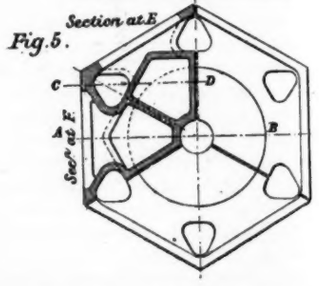












THE plant and franchises of the La Porte (Ind.) Gas and Coke Company have been disposed of to Eastern parties, whose headquarters are in Portland, Me. We understand that important plant betterments will be made by the new owners.

The Fire Risk of Electric Power Installations.

At the last meeting of the Manchester (England) Insurance Institute, Mr. A. Lester Taylor, Inspecting Electrical Engineer of the Liverpool, London and Globe Insurance Company, read a paper on "The Fire Risk of Electric Power Installations," in the course of which he said:

The President for 1896 of the Association formed by the Municipal Electrical Engineers, alluding to his address on the subject of wiring regulations and fire risk, said that the proper people to formulate regulations and see them carried out are the fire offices, and that "the more thoroughly this was recognized the more likely these offices would be to fall into line and organize their staffs so as to insure strict and general inspections." On such a subject as the inclosing of motors (which does not help the electricity supply engineer in any way), it is not surprising to find that no mention of it is made in any of their regulations, and that the matter is left to the fire offices alone to deal with. In all cases electrical installations have preceded rules, and rules may be taken as the embodiment of precautions which experience has shown to be necessary. As experience accumulates, so wider views become

possible; and rules are varied accordingly to meet these wider rules, and also to cover new and extended applications of the current. Thus, as to dynamos and electro-motors, with their risk of not only themselves taking fire, but of their throwing globules of molten copper (at an initial temperature of 2,300° F.) over wide distances, Mr. Musgrave Heaphy, who has rendered so much service by his able compilation of the Phœnix rules, stipulated in 1885 that:

"No dynamo is to be placed in any working room of any cotton mill, woolen, flax, jute or corn mill, or in any mill or factory of a like description; or in any working room or place where any hazardous process is carried on or in which any hazardous goods are stored;" and he explains "by working room is meant any room or place in which the new material is undergoing any process tending to convert it into a more finished condition." In an appendix to the same edition of the Phœnix rules, Mr. Heaphy says:

"In fixing the position of the dynamo, it must be remembered that several instances have already occurred of dynamos setting themselves on fire. A good deal of sparking may take place at the 'brushes' and the 'brushes' may burn." In the edition of 1896, after 10 more years' experience, the following wording is added: "*Electrical Machinery.*—No motor to be placed where there is risk; they must never be hidden away in cupboards, lofts or roofs, etc., unless permission to the contrary be given. Electrical motors when in rooms such as above described should be placed in an approved fireproof compartment, so that if the motor was on fire, the fire could not spread, and provision should be made that fine dust or 'fly,' etc., could not get to the motor. The resistance should be inside the above compartment. The positions in all cases must be thoroughly safe ones. The steam engine room or the mechanics' shop, for this purpose would not be considered as a working room."

He also says of electrical power installations (which were not mentioned in 1885) that "they require the same safeguards that apply to electric light installations, in which the conditions of supply and the electro motive force of the current are similar." Further, that "care must be exercised as described in rule 86, that the motor is placed in a thoroughly secure situation, and so arranged that, if on fire, the fire would be prevented as far as possible from spreading. Every circuit must have a cut-out and a switch on each pole. The connections to each should be such that the current can be entirely disconnected by switches from both poles of the motor when the motor is not in use, one switch to be used for starting and the other as an emergency switch," and in the appendix he adds:

"In fixing the position of the dynamo, it must be remembered that *many* instances have occurred of dynamos setting themselves on fire" (the "several" instances of 1885 having grown to "many" instances in 1896). These important additions can hardly be held to indicate a lessened estimate of the fire risk involved in the use of unprotected machines of this class. All our other fire office rules also practically prohibit the use of an open (or unenclosed) motor in situations where sparks from the 'armatures' or the 'brushes' may endanger stored goods or materials in process, as also do such foreign rules as the Swedish tariff regulations.

Some of the fire offices not using the Phœnix rules issued a separate set of rules, which as early as 1888 said that "dynamo machines must not be placed in any room in which inflammable material is manipulated, or in which easily inflammable material is stored, or which has openings into any room in which inflammable material is manipulated, or in which any processes causing dust or flyings are carried on. They must be fixed in a dry place free from dust and as cool as possible. They must not be placed within 12 inches of any unprotected combustible material other than their seating," and that "where electromotors are employed, the same care must be taken as with dynamos, and all their connections must be arranged in conformity with these rules. When used where inflammable material is manipulated or stored, they must be furnished with suitable incombustible coverings, and danger from sparking carefully guarded against." Even the 1897 rules of the Institute of Electrical Engineers, which are hardly likely unduly to hamper the electrical industry, require that "motors should be so placed that no woodwork or inflammable material is within a distance of 12 inches from them measured horizontally or within 4 feet from them measured vertically above them," thus clearly recognizing the liability to overheating and firing.

In the absence until recently of any uniformly enforced standard of precaution on the part of the fire offices, coupled with ignorance of the risk and of the rules on the part of the insured, the use of open and unprotected motors has begun in the most clearly undesirable situations. Experience of motors firing having necessitated recommendations of the provision of a separate compartment (or the use of a fully enclosed type of motor such as the samples you see in this room), it surely follows that it is unwarrantably hazardous to use an open type of motor within a working room of a cotton mill such as recently occurred at Glasgow. In other risks, presenting varying degrees of hazard, similarly open motors were being freely used in situations where a real enforcement of the rules would have prohibited them. Owing to the varying views on the part of surveyors, together with other not inscrutable reasons, some fire offices appeared to be undesirous of enforcing uniform precaution, so that neither the insured nor his electrical contractor knew what would be insisted upon in the mutual interests of the insured and the insurer (as they would have done in the case of a motor to be fed from street mains, in respect to precautions of interest to the electrical supply authorities). When, therefore, a certain measure of precaution in the shape of a fireproof covering for hazardously situated motors was made a tariff requirement by the fire offices' committee, I, as an engineer, thought that a very considerable step in the right direction had been attained, notwithstanding that in some very few instances, owing to previous laxity in the enforcement of the rules of the individual offices, some inconvenience to the insured might result, and that a perhaps not very necessary covering for some few less hazardously situated motors might be somewhat unduly enforced "to encourage the others." Some such inequality is of necessity characteristic of all broadly applied regulations.

It is somewhat unfortunate from the fire office standpoint that the commonly adopted type of motor turned out by the English makers has been a very open type (enclosed motors only being used for such purposes as mining or traction work where the external conditions necessitate a complete cover to protect the motor itself from damp and dirt). It is this very open type of motor, with its characteristic powers of producing undesirable "pinwheel" effects, which has led to its prohibition in working rooms by the English rules. The more commonly used type of American made motors, on the other hand, appear to be, as you will see from the samples here, very largely self-enclosed by an iron case, forming part of the designed construction of the motor. This self-enclosing having been called for by the tariff requirements, is now being rapidly adopted as a type by a number of English makers, and is infinitely to be preferred to the device of adding an undesigned cover to an open motor not intended to be so covered by the makers. In this connection I would mention that a dynamo maker, who is, with others, just equipping a new dynamo and motor manufactory in the North, told me they propose from the first to make self-enclosed machines as their standard pattern; that is to say, to make the now usual open machines the exception. Whilst to-day there may be in a small minority of cases some little difficulty in securing the covering of the old open type of motor, or some difficulty in a few other instances because the special circumstances do not, in the opinion of a surveyor, really require such protection from the motor, in the course of time all these difficulties will disappear through the common use of a self-enclosed motor in situations where a separate compartment is impracticable.

In this city the requirements of the corporation electrical engineer have brought into use types of apparatus which did not formerly occur, but of which the practical excellence has been admitted after the first difficulty of providing a fresh type has been overcome. With regard to the attitude taken by the trade journals on the new tariff requirements, it is significant to note that the *Electrical Review*, in publishing the rules, made no comment—evidently not considering that any hardship needing criticism was involved—and the *Electrician* merely remarked in an introductory paragraph: "They do not contain any very startling new departure." Already in the short time during which this enclosing of the motor has been a tariff requirement a number of makers have begun to turn out machines of this type, where previously only open ones were made. In some instances the prices of these motors are only very slightly higher than those of open ones, but in others, where makers have not yet settled down to the new type, very considerably enhanced prices are asked for them. Open competition will soon bring these prices to a more reasonable level. If it be argued that a self enclosed motor is unsuitable in very large sizes, then the alternative of placing it in a separate compartment, where the most free ventilation is practicable, can be adopted. It is most important to note that it is only where these machines are not in a separate compartment that enclosing becomes necessary to protect the surroundings. As a matter of common experience in surveying, it is most usual to find a motor in a Manchester warehouse, for instance, close coupled to a lapping machine, and with a wood box turned over it to protect the motor itself from its surroundings, not the surroundings from the

motor. With the usual English open type of motor, and with the wood floor and the wood box soaked with lubricating oil, together with the common practice of keeping oily rags, or wipes, within the same box for long periods together, undoubtedly a hazardous condition of things must exist in these cases. It can only be considered as a patching of an undesirable combination that the continuance of such an arrangement, with the simple addition of a fireproof lining to the box, should be passed. Even the iron box covering specified for future installations in these risks cannot, in my opinion, compare with the more simple and effective device of having a motor made self-enclosed once and for all, and so suitably designed for the purpose.

As there is no systematic compilation and publication of a list of electrically caused fires in this country, such as there is in the States, it is difficult to quote specific instances of fires originating at these machines. Some time ago, Mr. Musgrave Heaphy was favoring me by showing some of his interesting samples at his office, and he then showed me a collection of globules of copper which had, in a molten state, been thrown some 30 feet from a dynamo which had "fired," and he suggested my quoting this startling example should any one wish to urge that there was "no danger" in connection with these machines. One of our leading corporation engineers, who much prizes his motor load, and naturally objected to anything in the nature of a restriction to so important a branch of his supply business, said he could not see the necessity for the regulation relating to the enclosing of motors. On a later visit to him he admitted that some danger existed, as he had in the interval had one of his own motors burnt out with considerable sparking effect, so that he himself specified a metal covering to the exposed ends of the armature in his order for the renewal of the machine. The opinion of the fire offices' committee as to the liability of dynamos to self-fire has for a long time been clearly indicated by the extra rating where damage from such self-firing of the dynamo has to be covered.

The dynamo as a fire risk is to nearly the full extent as dangerous as a motor if unenclosed by a compartment or a case; but, just as the natural habitat of the motor is as close to the driven machine as possible, so the dynamo is most usually found inside the engine room—a very different situation, from the fire office standpoint, to the spinning room of a cotton mill. Therefore, it is much less seldom that any trouble arises as to the wrong situation of a dynamo; but, where it is hazardously placed, then proper enclosing is, of course, necessary, as in the case of the motor. I have extracted a few typical instances of fires originating at these machines from the American published lists. They are: Switch not located within sight of motor; motor burned out when started, and fire communicated to wooden case; motor and case destroyed; spark from small dynamo used in connection with an electric stop motion ignited cotton fiber on drawing frame in cotton mill; current left on 1-horse power motor used for working organ bellows in a church; fields finally burnt out; show window display; commutator on small motor attachment to a revolving window fixture arced and ignited cloth trimmings; elevator motor burned out by continued operation; employees left a store after using the elevator, but neglected to throw the motor switch, hence the machine continued to run. Poor adjustment of the brushes caused considerable sparking, which was noted by people passing the outside of the building. The building was entered and the motor found on fire. The wires leading to it were cut and the fire extinguished. I quote these last two cases to instance the desirability of enclosing the commutator and brushes as well as the armature and field magnet portions of the machines. There are a number of fires reported as originating at or near motors and dynamos of which the above form instances.

The motor and the source of current do not form a complete power installation. There are, of course, the connecting conductors together with the starting and regulating resistances, the cut-outs, and the switches. As to the conductors, the commonly applied rules as to the provision of sufficient sectional area to afford carrying capacity free from uundue heating suffice. The insulation upon the conductors should be of the typical high class character which usually obtains in England for lighting purposes, especially so as high voltages are more commonly used in power installations. The spacing apart of the terminals of disconnecting devices, such as cut-outs and switches, is also a matter of much importance, again in view of the high voltages used, so as to prevent permanent arcing. The proper covering of cut-outs, to prevent danger from flying and highly heated fused metal, is a simple necessity, greatly emphasized within the past few months by two large losses in this district. Then as to the resistances: These accesories, which are somewhat fully illustrated by samples before you, form a part of each installation, necessitating regulation as to construction and fixing, quite as much as motors and dynamos call for regulation. Absolutely fireproof construction and situation are very essential, so that if heated to redness they could not endanger their surroundings. They have formed a fruitful source of fires, and are a very fit subject for stringently enforced regulations. Concurrently with the recent great increase of the adoption of electrical power inside buildings for various purposes, has arisen in such towns as Bristol, Dublin, Hartlepool, Walsall and elsewhere, in increasing number, the substitution of electrical traction for horse haulage in respect to the tramway systems. You will notice that the most recent tariff regulations prohibit or tax the use of current for electrical power purposes where the current is obtained from dynamos or conductors of the description ordinarily associated with tramway propulsion installations, that is, having an "earth" return. Our newspapers are already publishing sensationally worded paragraphs referring to street incidents in connection with these eminently useful electrical lines, lines which are growing in number, and are, it appears, likely soon to be used in such important cities as Manchester and Liverpool. As American experience in this connection has been very wide, it may be useful to quote from expert insurance opinion, collected by the Boston Standard some time ago, as the result of inquiry respecting the necessity for prohibition or special taxing of the use within mercantile buildings of current derived from these trolley systems.

As I am afraid I may have already tired you by the length of this paper, and as I wish to have some time in which to explain to such as are interested, the different samples which I have been able to collect through the kindness of the various makers, I must refer you to the journal I have named for more detailed particulars than are given in the sketchy extracts which follow, namely—E. F. Cardell: "The trolley current should not, in any case, be allowed either for lights or power in mercantile buildings." H. Wilmerding: "The use of the trolley current (with a ground return) for light or power in any buildings except street railway buildings should, I think, be prohibited. If, however, this current is to be used, I believe the greatest safeguard would be to insist upon the location of the motor in a separate fireproof building outside the premises requiring light or power, and to convey the power to said premises by shaft, which for light should connect with a dynamo on the premises, it being understood that the conductors from the trolley should neither run through nor over any building except the fireproof motor house." Wm. L. Jones: "We do not permit electric lighting by trolley wires." A. J. Truesdell: "Taking power or light from the trolley wire where there is no metallic circuit is too dangerous to be allowed. It is, in my judgment, unwise to permit it even for a large consideration. Safeguards, so-called, may not be safeguards under all conditions liable to arise in connection with the trolley current." H. G. Hopkinson "desires to emphasize every point made in Mr. Truesdell's letter above." S. Y. Tupper: "Electricians tell me that the use of the trolley wire for light and power in mercantile buildings should be prohibited, or a heavy charge made therefor, and this I believe to be the correct principle which should govern rating associations in dealing with the subject." James A. Waterworth: "The use of the trolley current for light and power in mercantile buildings is a wanton invitation to fire, perhaps conflagration. There is no charge that can measure the danger, and at present there is no known safeguard against it except not using it." G. W. Cleveland: "Trolley wires, on account of the large amount of territory which they cover and their relationship to the earth, lays them especially liable to static accumulation, which, jumping distances that the 500-volt current will not do, but will maintain after the path is once made, cause serious arcing, which, on account of the current available on the line, makes this form of service a dangerous circuit to enter buildings under any form of construction." A. E. Pinkey: "When the trolley wire is tapped and permitted to furnish light or power in buildings it is a rank incendiary and should be prohibited or an extra charge made." Wall & Whittemore: "The carrying of lighting wires from trolley wires to mercantile risks should be roundly charged for, and only permitted when each risk is provided with cut-out switch and lighting arresters." C. R. Tuttle: "I think during the past three years in the field that I supervise, the electrical hazard is chargeable with at least 20 per cent. of the fire waste," and he thinks special charges should be made. George W. Babb, Jr.: "I view the use of a trolley current for light and power in mercantile buildings as dangerous and improper, and would not condone the hazard by a charge, but favor refusing certificates for such currents. I think it should be refused recognition, and the companies should refuse to grant such permits, and should cancel where current is taken from trolley wires. Out of 109 fires in a certain list, 14 came from trolley wires." Mr. Babb also mentions a list of 475 electrical fires. Here are

some extracts from the American Quarterly Fire Reports: "Crosses between telephone and trolley wires. A heavy storm in which large flakes fell and froze to the wires caused a general wreck of telephone and telegraph wires and poles throughout the city; 110 telephones were burned out so that they had to be replaced; several thousand subscribers were disconnected, and practically only underground wires were working to any extent. Burn-outs in the main switchboards occurred several times, but arcs were extinguished by the use of dry sand and cloths. Several drops on auxiliary boards were also burned out. Fire alarm telegraph service was crippled, so that connections to several engine houses were broken." Another: "We had a severe storm recently which played havoc with overhead wires in the streets. A large number of the telephone company's new distributing poles, 90 feet in height and 13 inches in diameter, were broken and fell, letting down wires in all directions. Together with this, nearly all overhead wires were disabled and crossed with electric light and trolley wires. The trolley railways were interrupted for several hours; 10 horses were electrocuted on the streets, hundreds of telephone, telegraph and fire alarm signal boxes were burned out." A third runs: "Cross between trolley wire and telephone, set fire to telephone exchange switchboard. Fuses were introduced on the telephone lines, but were not of sufficient length to prevent trolley current arcing across terminals. Loss, $1,000." From which you will see that telephones are responsible for something besides bad language, and that they also involve fire risk. In this country recently, a falling telegraph pole brought the wires in contact with a trolley wire, with the result that a number of telegraph instruments were burned out. Several fires occurred in Hamburg last year caused by the switching of the tramway pressure on to the lighting network.

Reverting again to our tariff rules, rule No. 11 as to the receptacles necessary for waste oil and oily waste has special point in view of the now frequent installations of motors where no previous experience has existed of fast running machinery and where such copious use of lubricants is thought to be necessary. The requirement that the pulley of the motor shall be external to the case or compartment prevents the belt from being a vehicle for the carrying of fire *out* of the case or of fluff and dirt *into* the case. On a recent survey in Liverpool, where an iron case had been provided for a motor near a saw bench, but with the pulley inside the case, the insured devised a curious arrangement of brushes to clear the belt as it passed into the case so as to protect the motor from dust, an example of the advantage of having the pulley and belt outside the case, or better still, of using a self-enclosed motor. With the exception of this detail, and as you will have perceived from the extracts I have read to you, the only new point in the tariff regulations as to the motor, is that it makes it a condition of normal rating that the unanimously expressed opinion in all fire office rules—dating even from 10 years ago—shall be uniformly observed in the interest alike of the insured and the insurance companies.

Finally, in rule No. 5, a switch upon each main conductor is required so that the whole current may be entirely disconnected in the event of fire or other emergency requiring it. One would suppose that such a switch, which has a somewhat similar duty to the main tap at a gas meter, is a matter of such elementary importance, especially where the source of supply is out of the control of the user, that it would be already universally enforced. All fire office rules have from the earliest issues required them. Many electric supply authorities require them, but some of these authorities do not. Where they are required by the electric supply authorities they are always to be found. In striking contrast to this I could mention a number of towns where, notwithstanding fire office rules, because the electric supply authorities' rules do not require them they are most commonly absent, showing how largely ineffective fire office rules are in the absence of joint action amongst the offices to enforce them.

NATURAL GAS FOR CHICAGO FROM INDIANA.—*Iron Age* notes that a dispatch from Muncie, Ind., states that preparations have been made for supplying Chicago with natural gas fuel from the Indiana gas belt. The Central Contracting and Finance Company, of Lima, O., have leased 3,200 acres near that city, and have put a large force of men to work in drilling hundreds of wells in that and other parts of the gas belt. A pipe line was laid from Lima to Chicago last summer. The amount of gas necessary to meet the demand of Chicago is likely to be so great that the Indiana consumers of natural gas are fearing that they will suffer from a scarcity when this great drain on the gas field is initiated. It is not unlikely that steps may be taken to enjoin the company from undertaking the contemplated enterprise.

[OFFICIAL REPORT.—REVISED BY THE SECRETARY.]

PROCEEDINGS, TWENTY-EIGHTH ANNUAL MEETING, NEW ENGLAND ASSOCIATION OF GAS ENGINEERS.

HELD IN YOUNG'S HOTEL, BOSTON, MASS., FEB. 16 AND 17, 1898.

FIRST DAY, FEB. 16—MORNING SESSION.

The twenty-eighth annual meeting of the New England Association of Gas Engineers was called to order, at 11 A.M., Feb. 16, by the President, Mr. Samuel J. Fowler, of Springfield, Mass. The Secretary (Mr. C. F. Prichard, of Lynn, Mass.) having announced the order of business, on motion of Mr. A. B. Slater the reading of the minutes of the last meeting was dispensed with.

REPORT OF THE BOARD OF DIRECTORS.

Secretary Prichard said that the Board of Directors recommended the election of Mr. W. A. Stedman to honorary membership in the Association. On motion of Mr. Slater (seconded by Mr. Nettleton) the recommendation was indorsed, and Mr. Stedman was declared chosen an honorary member. Mr. Slater, in moving the action here reported, said that all the older members knew Col. Stedman well and remembered his valuable services to the Association when the Association needed strong counsel and safe guidance.

ELECTION OF NEW MEMBERS.

The Directors recommended the election to active membership of the following named persons:

Barnum, D. D., Worcester, Mass.	Martin, T. R., Portsmouth, N. H.
Crawford, R., Stamford, Conn.	Moynihan, J. F., Stoneham, Mass.
Dole, C. E., Bangor, Maine.	Norton, P. F., Nashua, N. H.
Farnham, G. W., Lowell, Mass.	Thompson, G. T., Dedham, Mass.
Humphreys, J. J., Worcester, Mass.	Williams, E. H., Waterbury, Conn.
Lawrence, W. F., Derby, Conn.	Young, A. M., Rockville, Conn.

It was also recommended that Mr. George A. Alden, of Watertown, Mass., be transferred from the Associate to the Active list.

On motion of Mr. Slater, the Secretary cast the ballot of the Association in favor of the election to membership of the persons named.

The Secretary—The Directors also ask for an instruction, by the Association, as to Article IV. of our Articles of Agreement. They are continually called upon to decide the problem as to which class applicants for membership should be assigned, and they wish the instruction of the Association on that subject. The article reads that "*Any New England gas engineer* may become an *active* member upon application to the Secretary, accompanied by the indorsement of two active members of the Association and the membership fee of $5, the approval of the Board of Directors and an election by three-fourths of the votes, at any regular meeting of the Association, and by signing an agreement to pay such assessments as may be levied by the Board of Directors. * * * Any person *residing in New England and connected with industries pertaining to the gas business*, may become an *associate* member upon conditions prescribed for active members." As I said before, it has been found difficult at times to determine in which class applicants should be placed, and the Directors desire some instruction on that matter for the future—not for the present.

The President—With the consent of the members I will appoint Mr. Lamson and Mr. Allyn a committee to present to the meeting such amendment as they think desirable to have introduced into this Article of the Constitution which has been read.

President Fowler then read the following

INAUGURAL ADDRESS.

Members of the New England Association of Gas Engineers:

Once more the rolling year has passed away, another third Wednesday in February has come and brought us together to these accustomed haunts to enjoy and profit by the 28th meeting of our Association, and to renew the ties which bind us all in companionship and amity. That the expectations with which you come may not be disappointed is my earnest wish. May you gather useful information from the papers and discussions, and outside of meeting time may the social side of our Association be a pleasure, so that the recollection of this meeting may long be with you as one of the compensations of a business which has too often only troubles and worries.

We have been called upon during the year to mourn the loss of five members by death:

Mr. William Yorke, of Portland; Mr. Fred. W. Norton, of Nashua; Mr. A. H. Parker, of Bangor; Mr. James F. Rogers, of Jamaica Plain; Mr. George D. Cabot, of Lawrence.

I have appointed committees to draw up suitable resolutions on these deaths, and they will be presented to you later in the session.

But from the President's address you are accustomed to expect a résumé of the events of the preceding twelve months as far as they affect the lighting industry. For information we are accustomed to rely largely on the report of the Board of Gas and Electric Light Commissioners of the State of Massachusetts, which gives an accurate account of the development of our business in this State, and inferentially presents the situation of affairs in the whole district covered by this Association. I regret to say that this year I have not been able to have access to the report, which has been unavoidably delayed in its preparation and publication, so that my sources of knowledge are somewhat curtailed.

On looking back I see an almost universal report of increased output and of extensions, or, if extensions are not yet made, of plans for extensions in the immediate future to meet an ever growing sendout. To a certain extent the growth of our output enables us to sell gas cheaper, and selling cheaper may increase the sendout, though a close scrutiny of tabulated records of price and output, in the case of the companies with which I am best acquainted, does not seem to show any direct result of a lowering of price. The output seems to stand almost directly in the ratio of the population. The common commercial rule, that the cheapening of the price of a commodity increases the number of purposes for which said commodity can be used, must, however, be true of illuminating gas, and that, in spite of the competition of electricity and oil, gas has been able to hold its own and more, must be due very largely to its cheapness; and the increasing use of illuminating gas for cooking and mechanical purposes is only possible under the present conditions.

Our materials remain on substantially the same basis as last year, though the changes which exist are mostly in the line of reduction. We can manufacture more cheaply than formerly—the supplies we need for extensions and renewals are lower in price; but one point comes up here which seems to me worthy of our especial attention.

During the last few years there has been an enormous extension of our street railroad system, due to the use of mechanical power on the rolling stock. As a consequence there has been, especially in the suburban cities and towns, a broadening of the territory on which a given population can be conveniently housed. It has become a fad for the workingman to abandon the tenement in the heart of the town and to move into the outskirts, where he may be able to own his own house, and to give his little ones the benefit of playing room in the open and fresh air, all of which is very commendable in the workingman aforesaid; but, as a consequence, a great extension of the water pipes, the gas pipes, the electric conductors has accompanied and been necessitated by this development of street railways and the resulting increase of habitable area. In the case of the Company with which I am connected this extension into new territory has had a very bad effect on the gas sold per mile of main, reducing the quantity by more than 10 per cent. during the last half dozen years. A comparison, however, of some dozen or so of companies in Massachusetts outside of the Boston group shows that the sales per mile of main and per consumer have both remained fairly constant—constant in quantity only; the receipts per meter and per mile of main seem to be continually decreasing in proportion to the decrease in the price of gas. These comparisons of sales per mile of main and per consumer are very instructive, and show plainly how one company may be put to much greater expense than another to provide for the needs of its customers. For instance, we have in Massachusetts, within a few miles of each other, two companies, each of which gets about the same income from its sale of gas; the price charged by one being about one-third more than that charged by the other, but its output correspondingly less. How explain the difference in price? The main average of the one company is 250 per cent. that of the other, in proportion to the quantity sold. Think what that means, that the average errand takes twice and a half as long to do, that a meter set takes half a day and a trip by railway, and that the position of meter taker is sought as means of training by the would-be participants in the 6-day races in Madison Square Garden.

The methods of carbonization new to the general public which are now being adopted to some extent in various parts of the country, and are to be exploited to make possible the sale of Nova Scotia coal in New England, merit some attention. To one engaged in the business of manufacturing gas to be distributed for illuminating purposes, the project as we see it pushed in Boston awakens great curiosity, both about the apparatus to be used and as to the disposition to be made of the products. Though we may know by hearsay, and even by personal inspection, the way in which the apparatus is expected to work, we are not familiar with it as we are with the working of our own retort houses. Unable as I am to see in the retort oven process any advantage over our own way of carbonizing, I am ready to say that I should not be surprised if we, as gas engineers, ultimately derived some benefit from the plan. Our carbonizing plants in New England have generally adhered to the standard set some years ago. A regenerative or semi-regenerative power of furnaces has been very generally introduced with good results, but the plan of retort house working has remained substantially unchanged. The common introduction of water gas plants has often made it unnecessary to increase the carbonizing apparatus, and has probably deflected to a certain extent the close interest of the engineer from that department.

I have had the pleasure of looking over the plans, so far as they are completed, of the works to be erected by the New England Gas and Coke Company. As you probably know, the plan of operation of this Company is to use Dominion coal, or slack, in retort coke ovens and to save the surplus gas generated. It is supposed now that this gas will be sold to the companies at present engaged in the illuminating gas business, and will be brought by these companies to such a quality as to make it salable, and thus the population of Boston and vicinity will (according to these gentlemen) enjoy once more the inestimable advantages of a pure and non-poisonous coal gas.

The plans, so far as now decided upon, are to erect 8 blocks of ovens, of 25 retorts each, on the harbor shore. The blocks are in two lines, and between the two lines are the buildings to house the machinery; one building for the electric plant, another for the scrubbers and condensers, another for the treatment of the ammonia. At the outside of each double row of blocks are railroad tracks, so situated that the quenched coke will fall into the waiting cars for transportation. The arrangements for unloading coal from the vessels and delivering it to the retort ovens are of the very best and most approved style, so that the cost of handling and storing will be brought to the lowest point.

This first instalment of the plant is supposed to be sufficient to coke from 1,000 to 1,200 tons every 24 hours, but the plans are so drawn that the number of ovens can be easily quadrupled should such increase become desirable. As an example of engineering, as applied to the handling and utilization of coal, I believe these works will be worthy of the inspection and close attention of all of us, and something of the same nature may very possibly find its way into the works in which coal gas is now made. You will have before you a paper, telling of some of the observations made by one of our members during a late European trip, in which this topic of handling coal and coke is touched upon. I believe the methods now in use here are capable of improvement. I read a few days ago a statement, by Mr. Geo. Livesey, of London, that, while the cost of labor in Edinburgh was 4s. 6d. ($1.10) per ton of coal, in his own works he had been able to reduce that expense to 1s. 6d. (37c.), or to one-third of the Edinburgh cost. To be sure, coal and all such heavy materials can be handled much more economically when there are large quantities to deal with, and our coal gas works are hardly large enough to enable us to work on the most economical basis; but, as I said before, I should not be surprised if something of advantage came to us all from having our attention once more turned in this direction.

One good the promoters of this coke oven project have certainly but unwittingly effected. They have bound together the independent gas companies of the State of Massachusetts more firmly than ever they were bound before. The promoters attempted to obtain such extraordinary privileges that the owners of gas works felt themselves in imminent peril, and banded together to resist such aggressions. The gas companies were successful in their endeavor, and, having learned wisdom from experience, are now keeping up an organization for the general mutual protection and defence, the good effects of which have been felt not only in this State but also in various others, where promoters have made attacks on established interests similar to the attacks made here.

As I read this paper it seems almost more than ever doubtful whether anything will be developed out of the coke oven, pipe line scheme; but that the whole matter is of absorbing interest, both technically and legally, no one will dispute.

From time to time we read or hear accounts of improvements in gas engines, of a new engine to be placed on the market, and of engines running with a much decreased quantity of gas, but to the best of my knowledge such things have not yet materialized to a very great extent. A small gas engine is a convenient and economical source of power sometimes, but still for convenience it is beaten by the electric motor, and for economy can be beaten by the steam engine, especially in our climate, where the exhaust from an engine can generally be used for

heating during more than half the year. Ordinarily one has to have a boiler anyway; so, why not use a steam engine? But I am glad that the climates offer a large field for gas engines. They should be so made as to be much more economical than steam engines, and that there is steady progress no one can deny. Should the aim of the many who are working on the problem of constructing a large and economical gas engine be attained, it may redound primarily to the advantage of our electric friends; but we shall undoubtedly come in for some share of the profit.

And now, in conclusion, a few words regarding the relation of our industry to the general public. Two years ago you listened to an inaugural address in which was much good advice to all concerned in the management of gas companies, from directors down to office boy. I feel that such advice has not been thrown away—that there has never been a time when directors were more heedful of the advice given by the manager or engineer, or more willing to do their part in the advancement of the common welfare; and managers have studied into the details of their plants to put all parts into the most efficient condition. Years ago it was stated to me, by a gentleman in high authority, that most of the friction between gas companies and the public arose, not from the act of any superior officer of the company, but from the conduct of the clerks in the office, who did not know how to handle customers. It may perhaps be laid to the credit of the introduction of gas stoves and Welsbach burners in late years, and the consequent conversion of the collector into the salesman, that a different tone rules to mutual satisfaction. For a good salesman must know how to make himself agreeable to every possible purchaser. In the collection or possible adjustment of a bill he cannot afford to offend in the slightest way anyone who may afterwards wish to buy any of the numerous gas appliances which many of us keep on sale, and is thus practically obliged to treat everyone with deference and courtesy.

There never has been a time when the clerks in the office were so regardful of the interests and feelings of consumers, so that the old friction between gas companies and the public may soon be reduced to such a point that the old joke about the lying gas meter can be laid on the shelf. The honest efforts of the companies to extend every courtesy and every facility to their customers are meeting with recognition, and people are believing that we are doing our very best to serve them.

The Address was referred for consideration and report to a committee of three

[To be Continued.]

ITEMS OF INTEREST FROM VARIOUS LOCALITIES.

THE Boston (Mass.) Gas Light Company is erecting a new plant in the Commercial Point district of Boston. This new plant consists of a building about 52 feet wide and 182 feet long, having brick side walls and brick partition walls, dividing the structure into three distinct parts—a generator house, blower room and condenser room. No wood is used in the construction of the building, and it is absolutely fireproof throughout. The floors are of steel, and the roof is covered with slate supported on steel roof trusses and framing. The contract for furnishing and erecting the steel roof work complete has been let to the Berlin Iron Bridge Company, of East Berlin, Conn.

MR. WM. M. PARKER, who occupies a responsible position with the Bellingham Bay Gas Company, of New Whatcom, Wash., writing to us under date of the 8th inst., says:

To the Editors AMERICAN GAS LIGHT JOURNAL: Perhaps the following may be worth publishing in your "Items of Interest from Various Localities." In your issue for January 31st I notice that Spokane is numbered with the best. We are a little further west than they are, and consequently the price of gas gets lower the further west you go. We have the usual opposition with which to contend. The prices charged by our opposers are as follows:

"Bellingham Bay Improvement Company, office, B. B. & B. C. Depot Building. The following rates will be charged for electric lights after February 1, 1898:

Arc Lamps. (2,000-Candle Power.)			Incandescent Lamps. (16-Candle Power, Residence Sales.)		
10 o'clock, per month		$5.50	1 lamp, per month		$0.75
12 o'clock,	"	6.50	2 lamps,	"	1.00
All night,	"	8.00	3 lamps,	"	1.10
			4 lamps,	"	1.20
			5 lamps,	"	1.25

(Contracts for 6 and 12 months.)"

Fuel costs this Company nothing. In order to meet the above our Company has reduced the price of gas from $3 to $2 per 1,000 cubic feet, for illuminating account; for fuel account, $1.75 per 1,000. Welsbach burners, $1.25; mantles, 35 cents. We introduce services and set meters free of all cost, and gas fitting is done at cost. At present we have 13 miles of main in use, and we propose to add thereto about 3 miles this spring. We have 360 ordinary meters placed, and also have going 36 prepayment meters of the type manufactured by the American Meter Company. Last year witnessed our first attempts to introduce gas stoves, so we have only 30 of them on our fuel list. We are looking forward to a pronounced increase in our sendout for this year over that of last year. Our Spokane brother hit the nail squarely on the head when he said, "If you want business, go after it." In other words, keep what you have and get all you can; and, with the aid of the prepayment meter, you can come nearer to holding what you do get. One of our consumers said, after using a prepayment meter for three months, that he incurred no risk now in joining the church, as he had not used any vulgar language since. He was also willing to die if he were sure that he could work the prepayment system when he reached the other side, for he was sure of getting his heat when he paid for it, and all he wanted for the price, and when he wanted it. He had heard strange yarns about gas companies, but he never thought it would come to pass that a gas company would be the means of preparing a person beforehand. Such instances as these give confidence to the public; and of late we have had frequent calls for these meters, without solicitation on our part. I hope that I will be able to enlighten you later on as to our success with our new schedule of prices in the near future.

THE only change in the personnel of the Board of Directors of the Indianapolis (Ind.) Gas Company, as reflected by the last annual meeting of the Company, was the naming of Mr. F. S. Hastings to succeed Mr. S. D. Pray. The latter retains his position as Secretary.

THE annual statement submitted by the proprietors of the Peoples Gas Light and Coke Company, of Chicago, shows that the Company, having provided for the interest on its funded debt, earned a further sum equal to a dividend of 6.36 per cent. on its capital stock. At the end of the year the Company's main system numbered 1,526 miles, it had 199,473 meters in use, and supplied gas to 32,425 public lamps.

MR. THOMAS D. MILLER, Secretary and General Manager of the Dallas (Texas) Gas and Fuel Company, under date of February 15, published the following notice of an amended gas rate by the Company:

"In 1889, when we reduced the price of gas to $1.90 per 1,000 cubic feet, we were selling gas lower than any other gas company in the Southwest. At that time we pledged ourselves to maintain that price only until such time when we could still further reduce the charge. For the past eight months we have been using the Corsicana oil in conjunction with our coal gas apparatus, by means of which we have improved the quality of our gas 25 per cent., and we also find that we can now make a further reduction in the price of gas. All gas used on and after March 1, 1898, will be billed at $2 per 1,000 cubic feet, and upon payment of the bill at the office of the Company, No. 261 Main street, on or before the 10th of the month following that for which the bill is rendered, a discount of 15 per cent. will be made on gas used for light, and a discount of 25 per cent. on gas used for fuel; making gas for illumination, $1.70 per 1,000 cubic feet, and gas for fuel, $1.50 per 1,000 cubic feet. In consideration of this low price (the lowest in the State), no discount will be allowed after the date named."

HENRY MARQUAND, L. C. Harris and R. D. Appersou have petitioned the City Council, of Staunton, Va., for the right to construct and operate an opposition gas works in Staunton. There is not much likelihood that the Council will agree to the prayer.

A RECENT issue of the Utica (N.Y.) *Morning Herald* had this to say: "A resident of Sherman Place made his young son a present of a revolver. It was pretty cold for accurate target practice out-of doors yesterday, so the lad betook himself to the cellar. There he found a nice target—three white disks on a black background—and began practice. He landed three bullets in the target before practice was interrupted; but he had done the business for the gas meter, and a new one was ordered. The cost of the lad's revolver practice is placed at $16, exclusive of ammunition and kindly counsel as to the selection of targets."

A CORRESPONDENT forwards the following, from Milwaukee, Wis., under date of the 11th inst.: "The Milwaukee Gas Light Company has announced a reduction in price of gas to large consumers, both on illuminating and fuel account. For illuminating purposes, for all

quantities under 25,000 cubic feet passed through a meter in one month, the price remains unchanged at $1 per 1,000 cubic feet; for an additional 10,000 cubic feet passed through the meter during the month, the price is reduced to 90 cents per 1,000, and for all additional consumption over 35,000 cubic feet, at the rate of 80 cents per 1,000. The initial 10,000 cubic feet used on fuel account for the month, is to be billed at the existing rate of 80 cents per 1,000 cubic feet; when the consumption per month is 20,000 cubic feet, the second 10,000 goes at 70 cents per 1,000 cubic feet; and all consumption in excess of 20,000 cubic feet is to be billed at the entire rate of 60 cents per 1,000 cubic feet. Of course, it is understood that the rates named are net, through prompt payment; otherwise, 20 cents per 1,000 cubic feet is added.

THE "gas syndicate" of San Francisco, seem to think that the "old days" of the "dead" mining exchange should be revived. Their especial play just now is to "bob" the securities of established gas properties; at least, it so looks to us, who are so many miles away. In any event, the report that Messrs. Phelan, Tevis and Whittell proposed to form an opposition gas company for San Francisco, caused San Francisco Gas and Electric Company shares, and the shares of the Pacific Gas Improvement Company as well, to drop 4 or 5 points in as many hours the other day, which rather goes to show that "Davy" is the same old coon. Did we own any San Francisco Gas and Electric (or any Pacific Gas Improvement) shares we'd keep our stock, no matter how hard blew Phelan-Tevis-Whittel and their silent partners.

AT the annual meeting of the Portsmouth (N. H.) Gas, Electric Light and Power Company, the following officers were chosen: Directors, M. Eldredge, H. F. Eldredge, W. W. Cotton, John H. Cheever and H. W. Waldron; President, Marcellus Eldredge; Vice-President, Heman F. Eldredge; Treasurer and General Manager, H. W. Waldron. A dividend of $2 per share was declared, payable since Tuesday last.

THE artificial lighting properties of Ogdensburg, N. Y., are to be organized. We are told that the proprietors of the Ogdensburg Power and Light Company are the capitalists who will conduct and complete the reorganization.

AT the annual meeting of the San Francisco (Cal.) Gas and Electric Company the officers chosen were: Directors, J. B. Crockett, Peter Donahue, Adam Grant, Chas. M. Green, J. D. Harvey, Daniel T. Murphy, George W. Prescott, Albert H. Payson, Levi Strauss, Jas. B. Stetson and W. F. Whittier; President, Jos. B. Crockett; Vice-President, Adam Grant; Secretary and Treasurer, William G. Barrett.

THE Economy Gas Light Company was incorporated last week, with proposed headquarters in Jersey City, N. J. The sponsors for the concern are Jules S. Bache and Robert A. Hensley, of New York; Robt. M. Snyder and M. M. Sweetman, of Kansas City, Mo.; and Frank E. Ainsworth, of Jersey City. The authorized capital stock is $50,000, of which $20,000 has been paid in. The object of the Company is "to manufacture gas engines, gas lamps, gas machines and similar articles."

IT is said that the purpose of the American Investment Company, recently organized in Burlington, Iowa, by Messrs. George H. Highbee, J. M. Walsh and J. T. Remey, is to acquire ownership of the Burlington Gas Light Company.

AT the annual meeting of the New Britain (Conn.) Gas Light Company the following Directors were elected: J. H. Eddy, H. E. Russell, F. N. Stanley, E. N. Stanley and A. J. Sloper. On the recommendation of the Directors the capital stock was increased from $150,000 to $200,000, on account of the large outlays made and to be made in improving the manufacturing plant and extending the distributing system. It was also voted to reduce the selling rate to $1.75 per 1,000 cubic feet, gross, the old system of discounts for prompt payment to remain operative. Under this schedule the maximum net rate will be $1.57½ per 1,000, the minimum being $1.33 per 1,000. The revised schedule goes into effect April 1st. The meeting was entirely harmonious, and the proprietors of the Company are more than pleased over the outlook.

Lighting Buffalo from Niagara.

Iron Age says it is expected that within a few months the city of Buffalo will be lighted by electricity generated by machines operated by Niagara power. In order to accomplish this result and to reduce the cost of illumination the Buffalo General Electric Company will build a new station and install therein an entire new plant, casting aside all their present machines. The current for the operation of the station will be supplied by the Cataract Power & Conduit Company, and 11 static transformers to be installed will mark the end of one plant and the beginning of the other. These transformers will have a little over 300-horse power each, the 11 bringing the total capacity to near 4,000-horse power. They will receive the Niagara current at a voltage of about 11,000 and transform it to a current of heavy amperage, but of only 352 volts. They will be fed by two independent cables in order that the service of the station may not be impaired by any accident to either of the three-phase systems between the Falls and Buffalo. Each cable will be capable of carrying the entire power of the station. The 352-volt current from the lower side of the transformers will be carried into the light station on copper bus bars about 1-inch thick and 6-inches wide, and from these bars the current will be distributed to the various machines. From the Buffalo station electricity is supplied for three uses—namely, high tension direct currents for street lighting, low tension direct current for small powers, motors, etc., and high tension alternating for inside arc lighting and various uses. The new installation will consist of twelve 250-light units, arranged on an efficient and economical plan. The current from the bus bars will be used to operate or drive motors of 200-horse power, which will stand between two 125-light machines. The ends of the motor's armature will be connected to the armatures of the two generators and the direct current from the unit will supply 250-arc lamps of 10 amperes each. The low tension current for small powers will be obtained from two rotary transformers of 300-horse power each. The direct current from these machines will be of 550 amperes.

A novelty of the new station will be the frequency changers to be installed. They will be the largest machines of the kind in the country, and will change the current from 25 cycles per minute as it comes from the Falls to 62.5 cycles a second and a voltage of 2,200. In these machines there will be an armature revolution of 375 and 12 poles in the field. The cycles numbering 62.5 will give 125 alterations to the second. In a general way a frequency changer may be said to be a compound machine, one part of the unit being a motor and the other practically a generator—that is, it gives off an independent current of a different voltage and different number of alterations per minute.

Patent Amendments.

The House Committee on Patents has acted favorably on the bill amending the patent law of March 3, 1897, so as to limit the restrictions against patenting an article on which a foreign patent had already been issued, or previously described in a foreign publication. The bill provides that the restriction shall not apply to applications made within 60 days from the passage of the proposed amendment.

By an act of Congress, approved March 3, 1897, the law relating to patents was amended so as to provide that no patent shall be granted in this country for an invention previously patented in a foreign country on an application filed more than seven months prior to the filing of the application in this country. By the terms of this act it went into effect on January 1, 1898, and all applications not reaching the Patent Office before that date were debarred from the benefits of the law. It has been found upon investigation that this radical change in the law that existed for almost a century has worked much wrong and hardship to American inventors generally, and in many cases has injured citizens of other countries who extend to us reciprocal favors of like character.

The effect of the enactment of this bill will be to extend the manifest intention of Congress to afford to a peculiarly situated class of inventors an opportunity to come in within a certain time, and, as heretofore, avail themselves of a long existing law, and thus incidentally also to legalize those applications for patents which, by reason of unavoidable accident, mistake, ignorance, lack of opportunity or the like, have been delayed in the filing until after the 1st of January, 1898, and which by reason of the circumstance that their subject matter had been previously patented abroad for more than seven months are, by the radical changes wrought in the uniformly existing previous law by the Act of March 3, 1897, now either void or destined to become burdensome upon the Patent Office and to those concerned.

In view of the importance as well as fairness of the proposed measure, and the many reasons that can be urged in favor of its speedy enactment, there is every reason to believe that it will soon be on the statute books.

THE AMERICAN GAS LIGHT JOURNAL

A. M. CALLENDER & CO.,
PROPRIETORS.

THOS. J. CUNNINGHAM,
ELBERT P. CALLENDER,
EDITORS.

CHAS. E. SANDERSON,
MANAGER.

PUBLISHED ON EACH MONDAY OF THE YEAR AT
No. 32 Pine Street, New York.

MONDAY, FEBRUARY 21, 1898.

The Market for Gas Securities.

The market for city gas shares kept up last week with its recent record for unsteadiness and oddity. Of course, much of the unevenness shown is attributable to the unfortunate disturbances that threaten to involve our relations with Spain, but some of it is fairly chargeable to the antics of the legislators of the State, who are playing fast and loose with dollar gas bills and with other repressive gas measures. He, indeed, would be a wise one who could positively say just now what the ultimate acts of the Legislature will be in respect of gas legislation; but of this we are certain: The gas rate in the boroughs of Brooklyn and Manhattan, as now fixed by law, cannot be changed by legislative enactment (unless the Companies affected thereby consent to the abrogation of the contract) until the graded bills have run their course.

Consolidated to-day (Friday) opened at 192 to 192½, and at noon was 190¼ to 190½. The tone of the market was weak and unsteady, but we imagine it would not require many buying orders in Consolidated to put it well above the quoted rates of to-day. Mutual shows no particular change, while Equitable is notably lower than it was a week ago. Standard's common and preferred are steady, and East River common is in fair demand at better prices.

Brooklyn Union maintains its price very well, although it is much below what we consider fair value for it. Bay State does not hold out any particular promise of an immediate rise. Press despatches dated from Boston last Wednesday, recite that the Board of Gas and Electric Light Commissioners have decided that the issue of $1,000,000 stock made by the Massachusetts Pipe Line Company was illegally emitted, and the Commissioners have notified the Attorney General to proceed against the Company. This action is important, in that it shows that the home gas interests of Massachusetts are not depending on a broken reed, when the State Commission is appealed to for fair construction of the statutes. Peoples Gas, of Chicago, opened to-day at 94¾ to 95, which, of course, is ex-dividend of 1½ per cent. Consumers, of Jersey City, is manifesting considerable strength of late, the current quotation being 80 to 85. Baltimore Consolidated has recovered nearly all the loss recently made in it on account of legislation inimical to its interests. Detroit gas holds well up to the advance of last month, and Lacledes show no particular change. Mr. P. J. McNulty, Secretary and Treasurer of the Consolidated Gas Company, of Pittsburgh, Pa., forwards the following information concerning the proposed amalgamation of the gas interests of Pittsburgh:

"The Board of Directors of this Company have called a special meeting of its stockholders, to be held at the office of the Company, No. 614 Liberty avenue, in the city of Pittsburgh, Pa., on the 20th day of April, 1898, at 11 o'clock, A.M., for the purpose of voting for or against an increase of the common capital stock of said Consolidated Gas Company from three hundred thousand ($300,000) to four million dollars ($4,000,000), or to such an amount not exceeding four million dollars ($4,000,000), as shall be approved at such meeting; and, also, for the purpose of voting for or against the issuance of preferred stock of said Company, in addition to the common stock aforesaid, to an amount not exceeding two million five hundred thousand dollars ($2,500,000), as shall be approved at such meeting; and, also, for the purpose of voting for or against an increase of the indebtedness of said Consolidated Gas Company from nothing to five million dollars ($5,000,000); and, also, for the purpose of considering the advisability of the purchase and acquisition of other gas properties and stocks."

Gas Stocks.

Quotations by Cochran & Close, Brokers and Dealers in Gas Stocks.

35 WALL ST., NEW YORK CITY.

FEBRUARY 21.

☞ All communications will receive particular attention

☞ The following quotations are based on the par value of $100 per share.

N. Y. City Companies.	*Capital.*	*Par.*	*Bid.*	*Asked.*
Consolidated	$36,230,000	100	190½	190¾
Central	500,000	50		..
" Scrip	220,000	..	100	.
Equitable	4,000,000	100	220	226
Bonds, 6's	1,000,000	1,000	105	..
" 1st Con. 5's	2,800,000	1,000	114	.
Metropolitan Bonds	658,000	..	108	112
Mutual	3,500,000	100	325	350
" Bonds	1,500,000	1,000	100	102
Municipal Bonds	750,000	.	..	.
Northern	150,000	50	..	
" Bonds	150,000	1,000	..	
New York and East River	5,000,000	100	81	83
Preferred	2,000,000	100	112	115
Bonds 1st 5's	3,500,000	1,000	112	113
" 1st Con. 5's	1,500,000	..	105	106½
Richmond Co., S. I.	348,650	50	70	..
" Bonds	100,000	1,000	..	..
Standard	5,000,000	100	144	146
Preferred	5,000,000	100	160	167
Bonds, 1st Mortgage, 5's	1,500,000	1,000	114	115
Yonkers	299,650	50	130	.
Out-of-Town Companies.				
Brooklyn Union	15,000,000	100	121	121½
" " Bonds (5's)	15 000,000	1,000	114½	115
Bay State	50,000,000	50	3⅝	3¾
" Income Bonds	2,000,000	1,000	..	75
Boston United Gas Co.—				
1s Series S. F. Trust	7,000,000	1,000	..	90½
2d " " "	3,000,000	1,000	72	75
Buffalo Mutual	750,000	100	125	..
" Bonds	200,000	1,000	95	100
Central, San Francisco	2,000,000	..	95	..
Chicago Gas Co. Guaranteed Gold Bonds	7,650,000	1,000	104	104¼
Columbus	1,069,000	.	89	91
1st Mortgage	1,085,000	..	101	103½
Consumers, Jersey City	2,000,000	100	80	85
" Bonds	600,000	1,000	102	105
Cincinnati G. & C. Co.	8,500,000	100	205½	206
Consumers, Toronto	1,600,000	50	184½	187
Capital, Sacramento	500,000	50	..	35
Bonds (6's)	150,000	1,000	..	..
Consolidated, Baltimore	11,000,000	100	56¾	57½
Mortgage, 6's	3,600,000	..	107	107½
Chesapeake, 1st 6's	1,000,000	..	..	..
Equitable, 1st 6's	910,000	..	..	..
Consolidated, 1st 5's	1,490,000	..	..	..
Consolidated G. & E. Co.'s, Little Falls, N.Y.	90,000	100	..	100
Bonds	75,000	..	..	100
Detroit	4,000,000		59	61
" Con. Bonds	4,312,000	..	100	..
Equitable Gas & Fuel Co., Chicago, Bonds	2,000,000	1,000	..	101
Fort Wayne	2,000,000	..	82	84
" Bonds	2,000,000	..	87	90
Hartford	750,000	25	..	145
Indianapolis	2,000,000	..	115	125
" Bonds, 6's	2 650,000	..	106	107
Jersey City	750,000	20	180	..
Lafayette Gas Co., Ind.	1,000,000	100	88	90
Bonds	1,000,000	1,000	89	92
Louisville	2,570,000	50	..	..
Laclede, St. Louis	7,500,000	100	42¾	43¾
Preferred	2,500,000	100	90	92
Bonds	9,084,400	1,000	103	104
Montreal, Canada	2,000,000	100	200	.
Newark, N. J., Gas Co.	1,000,000	..	200	220
Bonds, 6's	4,000,000	..	128	130x
New Haven	1,000,000	25	203	..
Oakland, Cal.	2,000,000	..	53½	54
" Bonds,	750,000	..	..	..
Peoples G. L. & Coke Co., of Chicago	25,000,000	100	94¼	95
Peoples Gas Lt. & Coke Co., Chicago, 1st Mortgage	20,100,00	1,000	..	108
2d "	2,500,000	1,000	104	105
Peoples, Jersey City	500,000	50	..	175
Rochester Gas & Elec. Co.	2,150,000	50	..	..
Preferred	2,150,000	50	83	..
Consolidated 5's	2,000,000	..	87½	90
San Francisco, Cal.	10,000,000	100	94	94½
St. Paul Gas Light Co.	1,500,000	100	49	51
1st Mortgage 6's	650,000	..	84	87
Extension, 6's	600,000	..	..	..
General Mortgage, 5's	2,400,000	.	88	90
Syracuse, N. Y.	2,500,000	25	20	22
Bonds	1,000 000		94	97
Washington, D. C	2,000,000	20	250	
Western, Milwaukee	4,000,000	100	83	84
Bonds, 5's	3,556,000	.	103	104
Wilmington, Del.	550,000	50	200	

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DIVIDEND NOTICE.

OFFICE OF WELSBACH COMMERCIAL COMPANY,
40 WALL ST., NEW YORK CITY, Feb. 10, 1898.

The Directors have this day declared a quarterly dividend of two (2) per cent. on the preferred stock, payable Mar. 10, 1898, to stockholders of record at the close of business Feb. 28, 1898. Transfer books of the preferred stock will be closed from Mar. 1 to Mar. 10, 1898, both inclusive. Checks will be mailed

1185-3 EDWARD C. LEE, Treasurer.

WANTED,

A Man who has had Experience and is Fully Qualified to Lay Gas Mains.

First-class references will be required.

1185-tf Address "C. H. F.," care this Journal.

Position Wanted

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who can also prove meters, set them and take their statements. Location immaterial. Address

1185-1 "S. W.," care this Journal.

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by a man who has had 15 years' experience in building and managing gas works. Is a graduate of the University of Pennsylvania, from Civil Engineering division.

1185-tf Address "C.," care this Journal.

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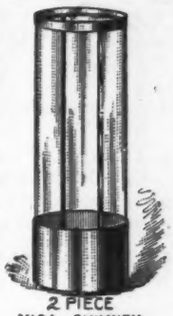

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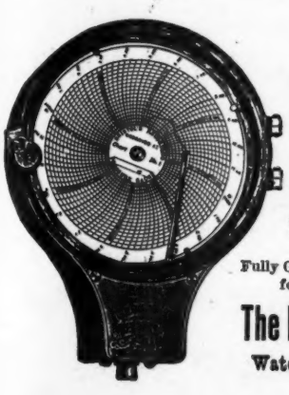

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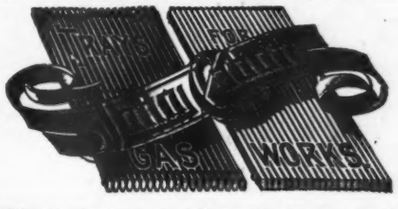

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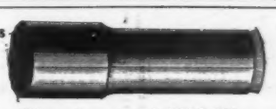

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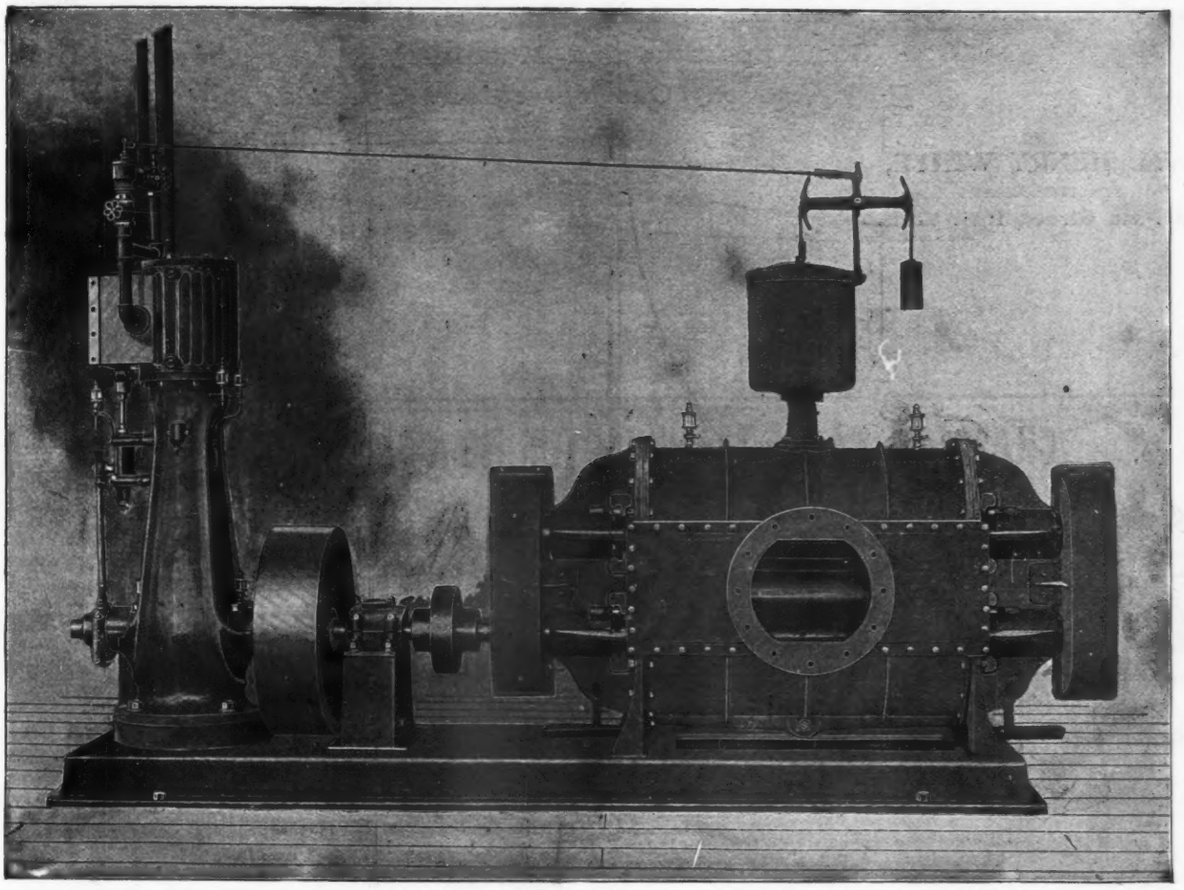

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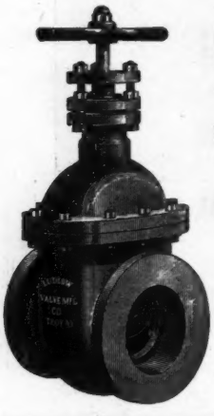

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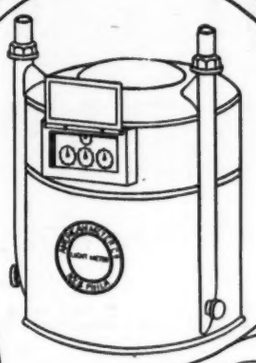

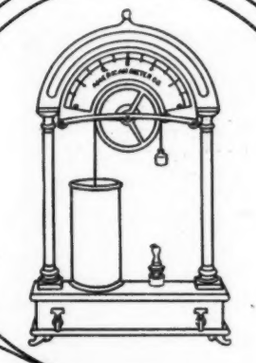

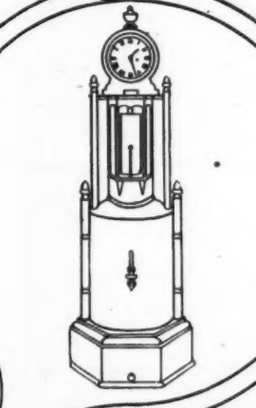

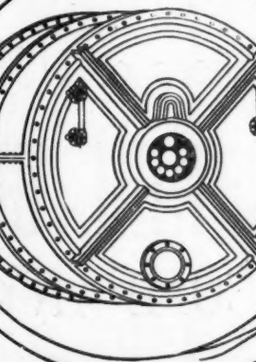

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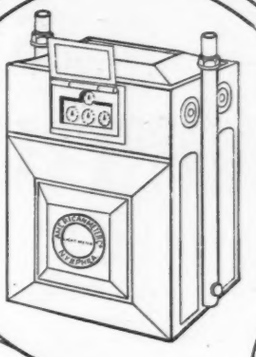

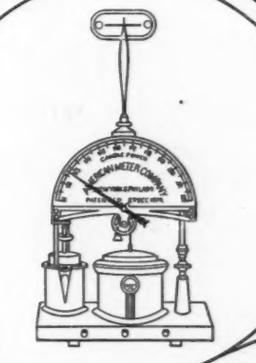

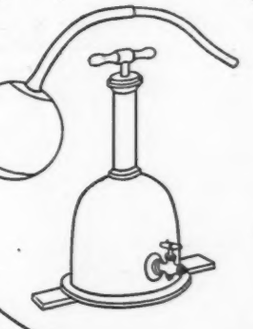

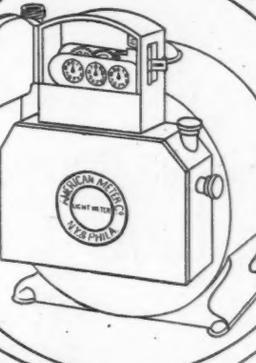

PUBLIC LIGHTING TABLE.

MARCH, 1898.

Day of Week.	Date.	Table No. 1. Following the Moon. Light.	Table No. 1. Following the Moon. Extinguish.	Table No. 2, New York City. All Night Lighting. Light.	Table No. 2, New York City. All Night Lighting. Extinguish.
				P.M.	A.M.
Tue.	1	2.00 AM	5.30 AM	5.30	5.45
Wed.	2	2.40	5.30	5.30	5.45
Thu.	3	3.20	5.30	5.30	5.45
Fri.	4	3.50	5.30	5.30	5.45
Sat.	5	4.20	5.30	5.40	5.35
Sun.	6	No L.	No L.	5.40	5.35
Mon.	7	No L. FM	No L.	5.40	5.35
Tue.	8	No L.	No L.	5.40	5.35
Wed.	9	6.30 PM	8.50 PM	5.40	5.35
Thu.	10	6.30	10.00	5.40	5.35
Fri.	11	6.30	11.10	5.40	5.35
Sat.	12	6.30	12.20 AM	5.50	5.20
Sun.	13	6.40	1.30	5.50	5.20
Mon.	14	6.40 LQ	2.40	5.50	5.20
Tue.	15	6.40	3.30	5.50	5.20
Wed.	16	6.40	4.20	5.50	5.20
Thu.	17	6.40	5.00	5.50	5.20
Fri.	18	6.40	5.00	5.50	5.20
Sat.	19	6.40	5.00	6.00	5.10
Sun.	20	6.50	5.00	6.00	5.10
Mon.	21	6.50 NM	5.00	6.00	5.10
Tue.	22	6.50	5.00	6.00	5.10
Wed.	23	6.50	5.00	6.00	5.10
Thu.	24	6.50	5.00	6.00	5.10
Fri.	25	6.50	5.00	6.00	5.10
Sat.	26	10.10	5.00	6 10	4.55
Sun.	27	11.00	4.50	6.10	4.55
Mon.	28	11.50	4.50	6.10	4.55
Tue.	29	12.40 AM FQ	4.50	6.10	4.55
Wed.	30	1.20	4.50	6.10	4.55
Thu.	31	1.50	4.50	6.10	4.55

TOTAL HOURS LIGHTING DURING 1898.

By Table No. 1.	Hrs. Min.	By Table No. 2.	Hrs. Min.
January	210.40	January	423.20
February	186.40	February	355.25
March	181.20	March	355.35
April	166.10	April	298.50
May	156.40	May	264.50
June	144.30	June	234.25
July	147.30	July	243.45
August	157.10	August	280.25
September	169.50	September	321.15
October	186.00	October	374.30
November	204.30	November	401.40
December	218.30	December	433.45
Total, yr.	2129.30	Total, yr.	3987.45

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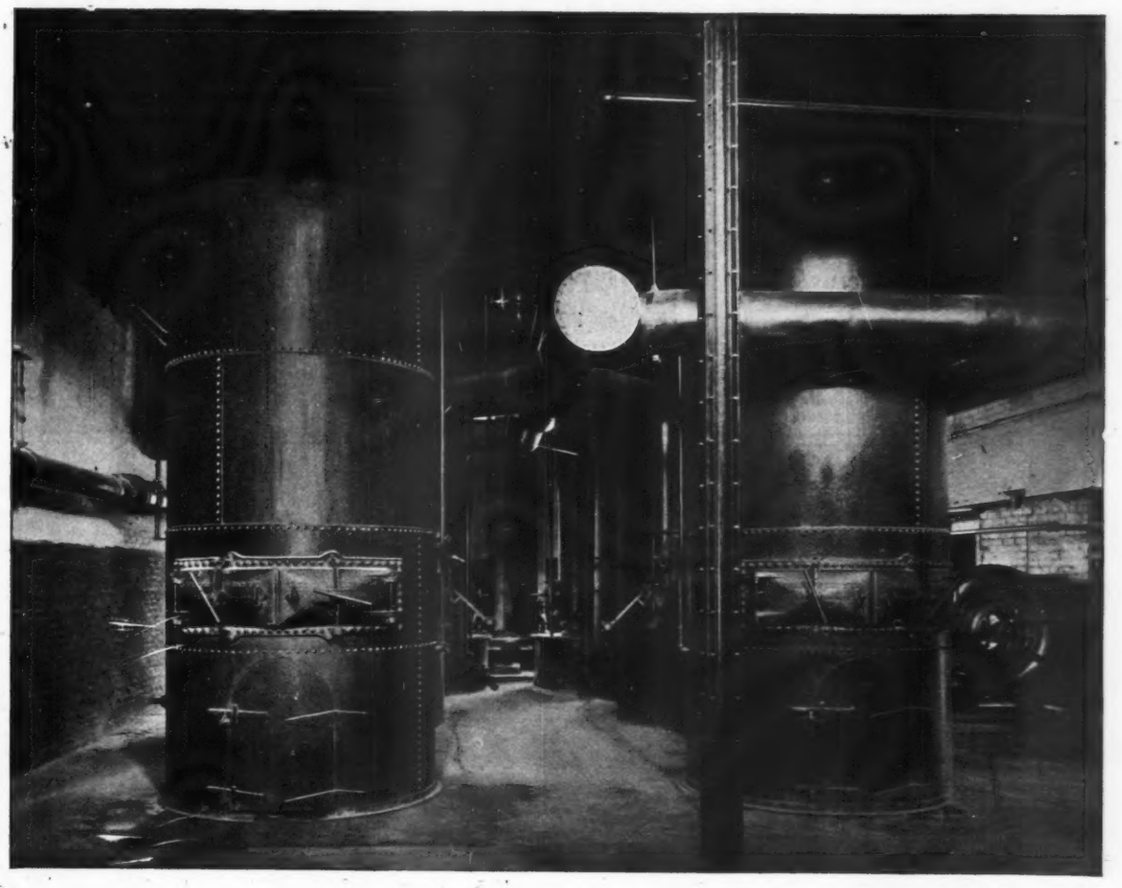

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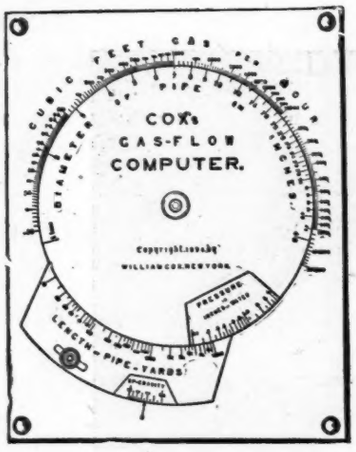

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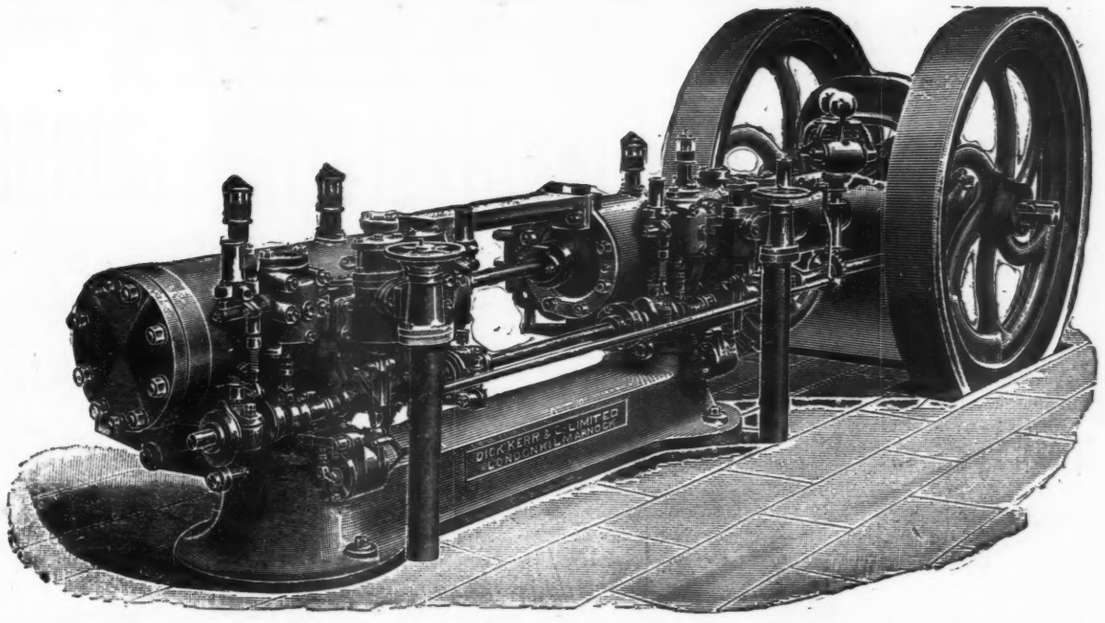

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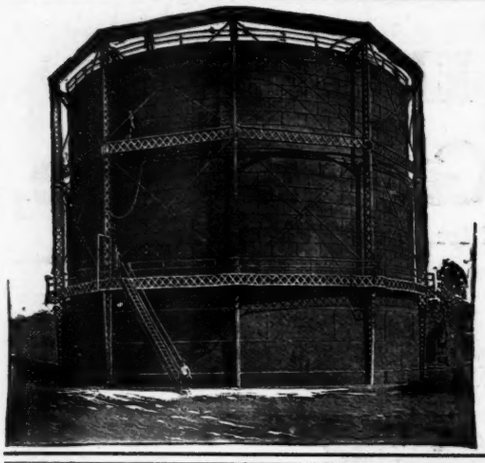

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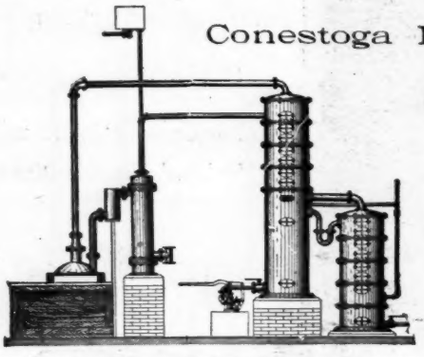

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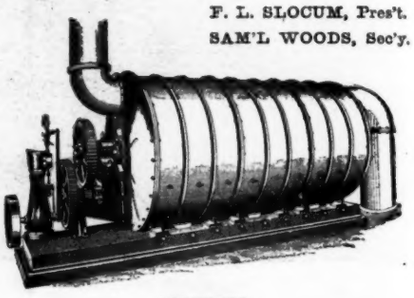

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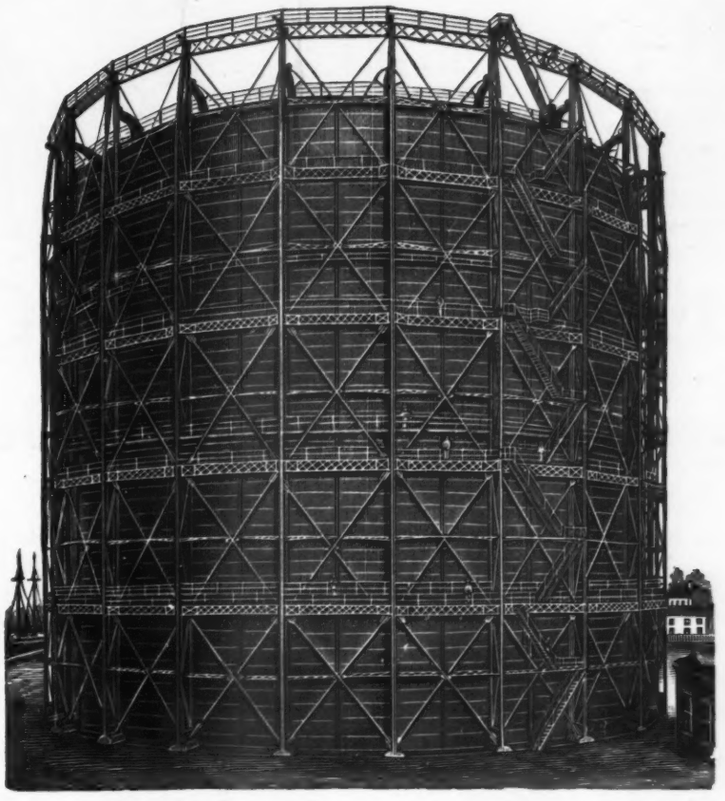

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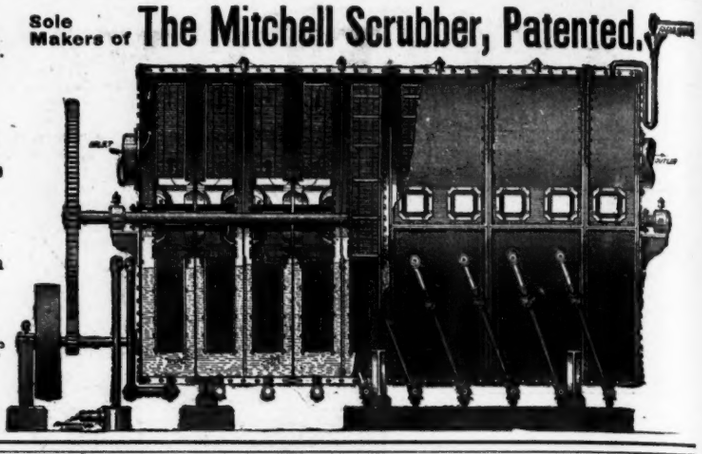

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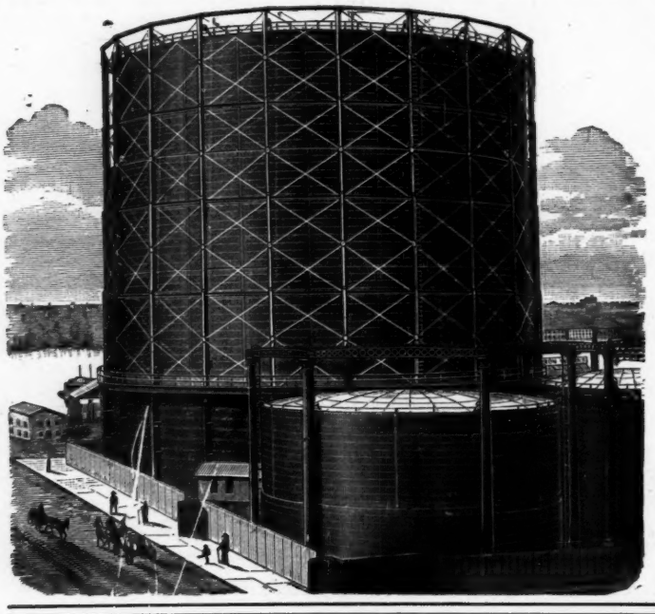

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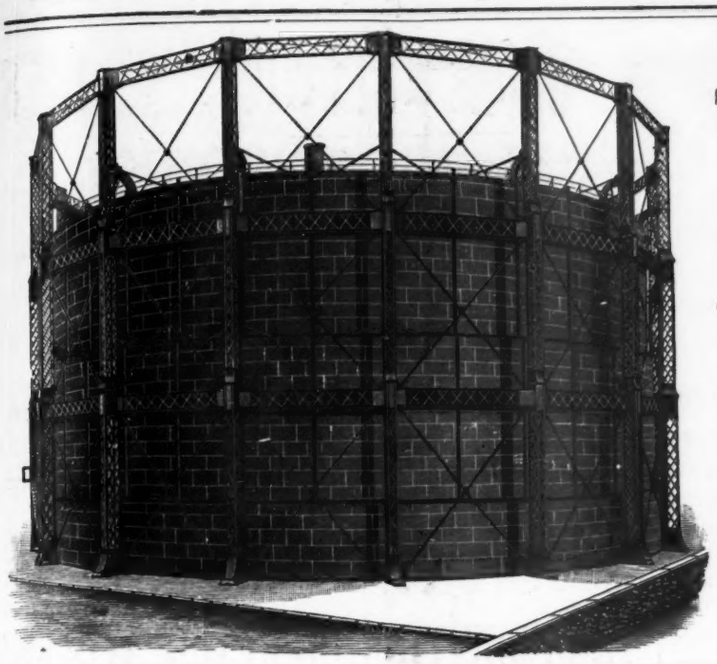

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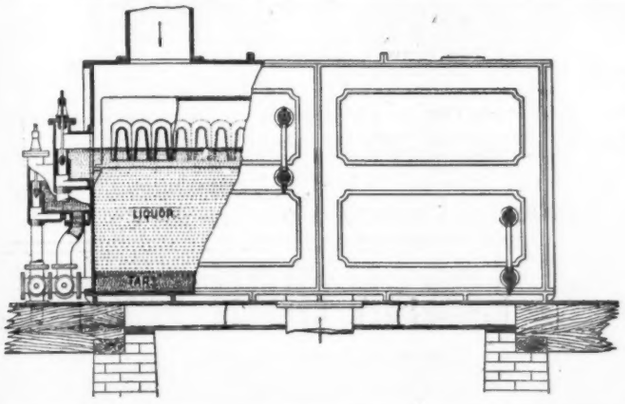

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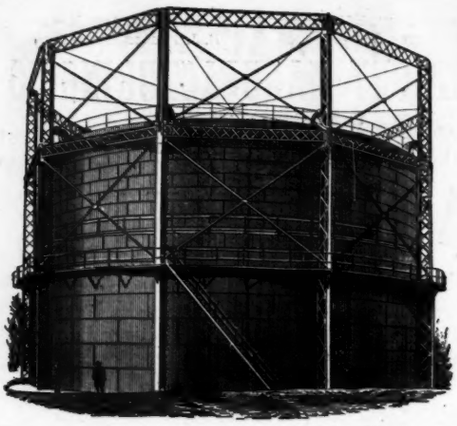

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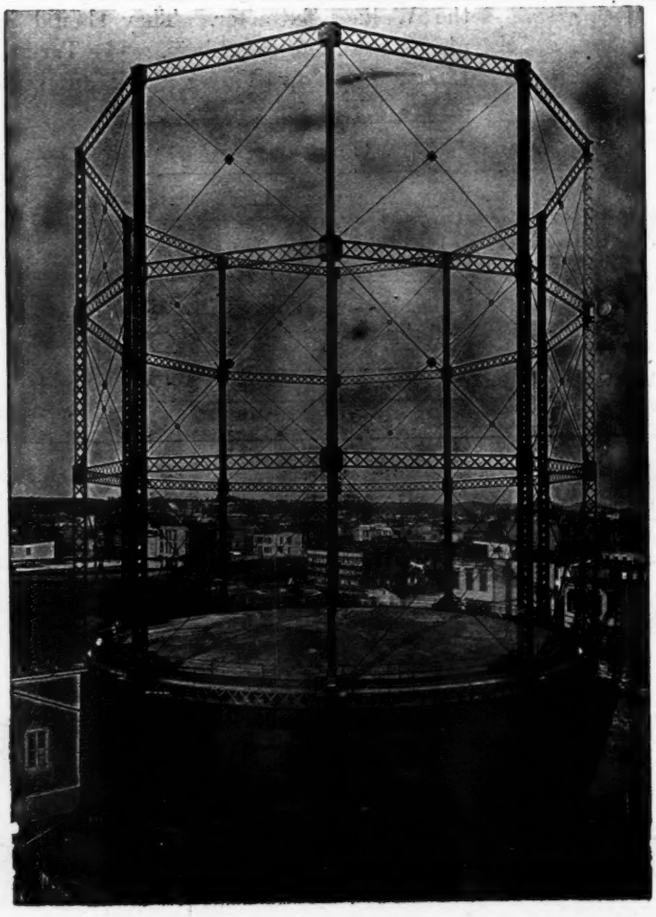

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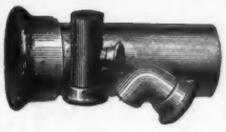
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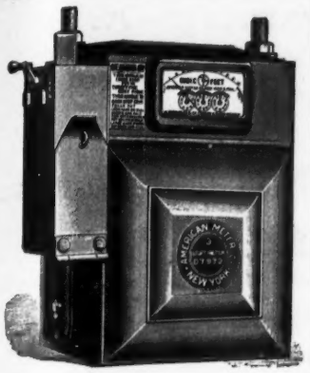

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